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MANUAL

OF

GYNECOLOGY

BY

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CONTAINING TWO HUNDRED AND THIRTY-FOUR ILLUSTRATIONS, MANY OF WHICH ARE ORIGINAL.

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PREFACE.

It has been the endeavor of the author of this book to supply the student with a Manual of Gynecology complete enough for study or reference in his college course, as well as a guide to him during his first years of practice. It is also intended as an adequate exposition of the subject to the older general practitioner, who recognizes the impropriety of an attempt on his part to manage the more complicated cases, or perform the more difficult operations belonging to gynecology.

The subject has been simplified by the use of two kinds of type, viz., a large type for essentials such as the student should master, and a small type for such amplification and addition of practical detail as may be of advantage for the practitioner, but which would burden the student's mind unnecessarily. The smaller type is appended to the paragraphs in such a way that it can be omitted or included in the course without creating confusion.

Minor operations such as may be safely performed by the general practitioner, as well as such of the more representative major operations as should be taught to the student, are described in the main text, while the unusual and complicated ones are described in small type by an enumeration of the steps and instruments, or by an explanation of the things to be done. Thus the general practitioner will not attempt the latter without consulting a larger work.

The chapters in part one on gynecological technique and the principles of gynecological treatment are more minute in their detail than is usual in such books, even to the description of many of the duties of nurses, for the purpose of enabling the student to understand, and the young practitioner to conduct, the preparation and aftertreatment of patients operated upon by professors or consultants.

The arrangement of the subject matter has also the advantage of maintaining the student's interest better than that found in most text-books. When a course begins with a consideration of the external genitals, the student, after a time, becomes impatient for the more interesting subjects, while the latter part of the course, with its weariness of mind and preparations for examinations, becomes crowded with important matter that is apt to be slighted. If, on the other hand, the diseases of the external genitals are left until the end of the course they are liable to be neglected both by the student and lecturer.

It is desirable to arrange a two-years' course by lecturing upon the first three or four parts to students of the third year, and upon the remainder to fourth year class. It is hoped that the numerous references will obviate any inconvenience that might at first result from the new arrangement. Combined with the numerous references, they have enabled the author to avoid many repetitions without taking away from the completeness of the exposition of the subjects, and thus, it is to be hoped, have given it some value as a book of reference for the practitioner without diminishing its value as a student's manual.

Valuable services in revision of the manuscript rendered by Dr. Marie L. White deserve grateful acknowledgment.

HENRY T. BYFORD, M. D.

Chicago, September 10, 1895.

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MANUAL OF GYNECOLOGY.

PART ONE.

DIAGNOSIS AND TREATMENT.

CHAPTER I.

DIAGNOSIS.

The diagnosis of the diseases peculiar to women is greatly facilitated by following a somewhat definite method of investigating the case.

1. **History.** First of all a history should be taken both for present need and future reference. After having, from the patient's narrative and some leading questions, determined that the case is gynecological, we should enter it in our books in about the following order :—

Name. Residence. Age. Single, married or widow. Occupation and social state and habits. General appearance.

2. **Childhood History.** Children's diseases. Any abnormal congenital or acquired conditions or diseases, and when first noticed.

Many pelvic diseases owe their origin to conditions existing in early life.

3. **Menstrual History.** Age of first menstruation, and condition of health at that time. Mode of commencement : whether regular or not, profuse or scanty, or painful.

Regularity and *length of intervals* since and at present time.

Duration and *amount of discharge* formerly and at present.

Appearance of discharge, whether clotted or stringy, or thin, light or dark red.

Is or has it been *painful* at any time, and when. Character and place of pain. At what time with reference to the flow.

4. **Marital History.** How long married. If widow, how long? Number of children and ages of each. Abnormal features connected with each labor. Number of abortions,—dates and causes. Were any of them attended or followed by diseased conditions?

5. **Family History.** Sometimes it is desirable to inquire into the diseases and habits of their parents and ancestors, with reference to hereditary tendencies.

6. **Sexual History.** In most cases the patient need not be embarrassed by direct questions upon this subject. If there is any great abnormality in the sexual relations, such as want of participation in the sexual act, or perverted function, she will be apt to speak of it or drop some hint. Some leading question after the symptoms have been recorded, such as "Is there any other symptom bearing upon your condition?" or, "Is your husband healthy and natural in every respect?" will draw from her some mention of it, and indicate to us the propriety or importance of more direct interrogation.

7. **Symptoms.** How long sick, and since when have the severer symptoms been noticed. Place and character of pains, whether in head, back, iliac region, abdomen, etc. Are they worse upon arising in the morning, or after being on the feet and exercising.

Ask for the symptoms referable to urinary organs and rectum, whether painful evacuation, tenesmus, etc.

Notice general nutrition. Inquire into the condition of the digestion, both gastric and intestinal, and also of the nervous system, with reference to headache, hysteria, neurasthenia, former attack of paralysis, etc. Notice condition of respiratory and circulatory system. Examine the urine.

It is customary to use forms for the record of gynecological cases, but they are necessarily spread over a large space and filled with too much detail, for any given case. One may use an ordinary blank-book, and enter the facts in a certain order, and thus get a compactly written history, from which all unnecessary matter is omitted, keeping the general order as just described in mind. Put down the name and residence of the patient and of her former physician, then her age, and occupation or social state, married or single. Then ask about the childhood history, and mark only what is noteworthy. Then record the age of first menstruation, and put only such other facts down as are unusual. Also put down the number of children and abortions, and anything unusual connected with them. Ask the date of the last pregnancy, and if the sickness dated from any of them. Then ask if she has pain in the back, iliac regions, limbs, head; also inquire for symptoms connected with urination, defecation, and digestion. Any general conditions bearing upon her disease are also noted. By this time we have made up our minds as to the desirability of an examination. In case of a virgin we endeavor, if possible, to make as complete a diagnosis as possible, for the purpose of avoiding an examination; but such diagnoses are usually quite unsatisfactory, and in those instances in which an exact diagnosis is desirable an examination must usually be made.

EXAMINATION OF THE ABDOMEN.

8. In examining the abdomen we make use of four methods: Inspection, Palpation, Percussion, and Auscultation.

9. **Inspection** is of value in indicating the presence and position of abdominal or pelvic enlargements, and the general condition of the abdomen. As the patient lies on the

back, with the clothes loosened, the umbilicus should be concave and the abdomen somewhat flattened around it.

In general distention from gases or ascites the umbilicus may be flat instead of concave, or may even bulge slightly from increased abdominal pressure.

Tumors or enlarged organs are apt to cause a fullness that is more marked in the neighborhood of their origin. The patient should breathe deeply while we watch the tumor, for by the motion of the skin over it we may detect its irregularities and its attachment, if any, to the abdominal walls, and possibly to the place from which it originated. The abdomen may be watched while the patient changes her position, in order to demonstrate farther its range of motion. When the patient raises the shoulders from the pillow, the recti flatten the abdomen somewhat, unless some resistant mass lies under them. Lineæ albicantes resulting from previous abdominal distention should be looked for.

10. **Palpation** often enables us to make a finished diagnosis. By using gentle pressure we can explore nearly every part of the abdominal and pelvic cavity. The fingers of both hands are pressed gently and steadily into the abdomen, either above, below, or laterally, and pushed deeper with each deep inspiration until the posterior abdominal walls are felt; then the fingers are shifted until all parts are gone over systematically and any abnormal conditions felt or their absence ascertained. The bowels should, if possible, have been thoroughly evacuated both of feces and gas, and the patient should be asked to take deep inspirations while the pressure is being made. Hardness, softness, tenderness, displaceability of parts, irregularities of surface, etc., enable us to differentiate between tumors, inflammation, fecal accumulation, fluids, inflammatory exudates, and the like. Pressure over the pelvic brim

enables us to feel the connection of a pelvic tumor with the pelvis, pressure under the ribs the connection with the liver, spleen, or kidneys. Palpation all around abdominal growths, with attempts at displacement in different directions, may demonstrate attachment to the intestines, omentum, pancreas, or abdominal walls, either posteriorly or anteriorly.

11. **Percussion** gives us information as to the solid, liquid, or gaseous nature of the abdominal contents, and the extent of each.

We can map out the dull areas, and compare these areas in different positions. In free ascites the resonance will always be on the highest point. When fluid is encapsulated, or a tumor immovable, the dullness does not change with the position. Fluctuation is found in ascites and thin-walled cysts.

Percussion acts as an aid to palpation. Thus a hard mass in the abdomen is usually dull on percussion, but may be resonant if it is an exudate involving intestinal coils. A gradual shading from dullness to resonance may denote either a thin edge of the mass, or adhesion of intestines to the edges. Slight resonance on superficial percussion, and dullness upon deep percussion (the fingers pressed firmly against the mass) may indicate a retroperitoneal growth, the intestines overlying.

12. **Auscultation.** Intestinal gurgling over a mass indicates either that it is retroperitoneal or that intestines are adherent in it, or are over it. Vascular murmurs may be heard over large uterine tumors, the pregnant uterus and aneurysms. Friction sounds may sometimes be detected in peritonitis. The sounds of the fetal heart are also to be heard in the later months of pregnancy, something like the ticking of a watch.

EXAMINATION OF THE PELVIS.

13. **Preliminaries.** The bladder and bowels should be evacuated shortly before the examination; if practicable the bowels should have been evacuated by laxatives. A plain water enema and an antiseptic vaginal douche are also desirable. A properly constructed table or gynecological chair give much more satisfactory results than a bed or a sofa. The hands should be thoroughly washed and a good lubricator provided, such as soapy water, sterilized oil or vaselin, or soap ointment.

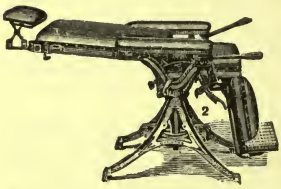

FIG. 1.—GYNECOLOGICAL CHAIR.

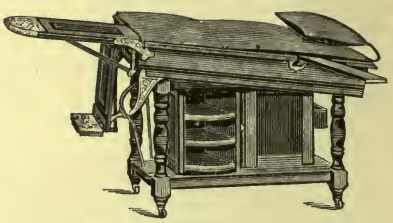

FIG. 2.—GYNECOLOGICAL TABLE.

The last lubricant mentioned consists of one part of lard and two parts of soap shavings rubbed into an even mass by the aid of a little hot water. The ease with which it is washed off makes it valuable for use when several patients are to be examined in rapid succession. If it becomes too dry and hard by age, a little hot water readily softens it.

14. **Postures.** An examination may be made in the dorsal, the left lateral, the genu-pectoral, and the standing postures, but the two latter are used only in determining the range of motion of the organs, and do not belong to ordinary routine examinations. Various modifications of the dorsal posture are used in operating.

15. **Dorsal Posture.** The patient is placed on the back with the feet drawn up against the nates and the knees

Dorsal Recumbent Posture.

The Dorsal Elevated Posture.

The Dorso-Sacral Posture.—Lateral View.

Edebohl's Posture.

The Left-Lateral or Sims' Posture.—Anterior View.

Left-Lateral or Sims' Posture.—Posterior View.

The Trendelenburg Posture.

The Genu-Pectoral Posture.

Fig. 3.

separated, or the feet may be held by stirrups projecting a few inches from the end of the table, or the knees may be flexed on the abdomen.

The first postures are used for ordinary office examinations, the last one for examinations under anesthesia. The dorsal postures are well adapted to digital, bimanual, rectal, and instrumental examinations, and all major and minor operations from below.

16. **The Left-Lateral or Sims' Posture.** The patient is placed on her left side, with the nates near the lower left-hand corner of the table, the left arm behind the back and both knees well flexed on the abdomen. The right or upper knee is flexed as far as possible, so as to extend over the under one and touch the table. The patient is thus thrown on the left breast, and the pubes and umbilicus are on a lower level than the coccyx and spine.

This posture is not as well adapted as the dorsal for the digital and bimanual examination, but is better for instrumental examination, vaginal tamponade and minor operations upon the cervix and anterior vaginal wall. When the speculum is introduced the uterus sinks away from the vulva and the vaginal walls are expanded before the eye. The anterior vaginal wall may be pushed up out of the way by a retractor or Sims' depressor. The clothing should be loosened about the waist, in order to allow the contents of the abdomen and the anterior vaginal wall to sink away from the vulva.

17. **The Genu-pectoral or Knee-chest Posture.** The patient kneels near the edge of the table and, with head thrown back and face turned to one side, allows the chest to rest on a pillow in front of the knees.

The shoulders are lower than the hips, and the parts sink away and the vagina is expanded by atmospheric pressure as in the left lateral posture. The posture is valuable for internal inspection and vaginal tamponade in exceptional cases. When the chest is supported over the elbows the position is called the knee-elbow posture.

18. **The Standing Posture.** The patient stands up-

right with the feet slightly separated, so that the physician, kneeling on one knee before her, can introduce the finger in the vagina.

This posture is used to determine the position of the uterus, and to determine the extent of downward displacement or relaxation of the parts when the patient is on her feet.

19. There are three varieties of examination of the pelvic organs—the ocular, the digital, and the instrumental.

20. **The Ocular Examination, or Inspection.** The external genitals, vaginal orifice, and anus are inspected with the aid of palpation. The labia are separated, and the finger introduced as far as necessary into the vagina or anus to give a better exposure. In case of relaxation or laceration of the vaginal entrance the patient should be asked to strain, and thus indicate the amount of relaxation or displacement. The color, the relaxation, contraction, deformity or displacement of the parts, exudates, ulcers, cicatrices, eruptions, varicose veins, tumors, hemorrhoids, fissures, etc., can thus be observed.

In many cases the absence of complaint on the part of the patient, and the information derived by the digital examination makes inspection unnecessary. It is well to postpone the exposure until the last thing unless the symptoms direct attention to the external genitals, in order to minimize her embarrassment. Inspection of the vagina and cervix will be considered as a part of the instrumental examination.

21. **The Digital or Manual Examination.** There are two varieties of digital examination, viz., the simple digital, made with one or more fingers introduced into the vagina, rectum, or bladder; and the bimanual, which is the digital examination combined with counterpressure over the lower abdomen by the other hand.

22. **Digital Examination of the Vagina** in the dorsal position is made as follows: The patient is covered by a

sheet and the clothes pushed up over the knees. The fingers of the right hand, slightly flexed, are passed along the inside of the patient's left thigh, or of the left hand along the right thigh, until their dorsal surfaces touch the labia. The latter are then pressed apart with the thumb and third finger, while the index, gently extended, recognizes the perineum and glides over the fourchette if the parts be normal, or immediately into the unresisting orifice if there be relaxation or laceration.

The anus may be easily avoided by remembering that it is closed tightly out to the external surface, is behind the labia instead of between their fleshy portions, and is seldom covered by hair in women.

23. Enlargement, induration or tenderness of the labia, relaxation, tightness or sensitiveness of the vaginal entrance, will be recognized without extra manipulation, and indicate the necessity of an ocular inspection or not.

The firmness, softness, prolapse, or cicatricial character of the posterior vaginal wall at the outlet, will probably next attract attention. By turning the palmar surface of the finger forward, tenderness or bulging of the urethra or anterior vaginal wall should be felt for. As the finger passes farther in, the vaginal walls feel somewhat like the inside of the cheeks, smooth and soft. The anterior wall is flat and somewhat resisting, the posterior wall, soft with a thick ridge running longitudinally under it, formed by the collapsed rectum.

24. After passing the vaginal entrance the finger should seek the cervix uteri, which projects into the vagina, and feels something like the end of a thick finger coming out of the anterior vaginal wall, about 2½ inches (7 cm.) from the pubic arch in the nullipar, or like a ball of the thumb in a multipar, or merely like a hardening of the end of the vaginal canal, with but little projection, in the old woman.

The vaginal portion of the cervix is, of course, smoother than the skin of the thumb or finger, and has a dimple or transverse depression in its center corresponding to the external os uteri. The size and shape vary within normal limits, the virgin cervix sometimes being as large as the end of the thumb, and multiparous often much larger and grooved by lacerations.

25. The long axis of the cervix should point downward and backward, so that the anterior wall is touched first, but it is often bent slightly forward or drawn to one side. When the anterior wall is touched and the extended finger brought up against the pubic arch, the finger impinges against the subpubic ligament between the second and third joint. When the finger tip is depressed it strikes the coccyx about an inch from the cervix. If the cervix is laterally located, the depressed finger tip strikes the pelvic floor a little to one side of the coccyx. By pressing the finger tip laterally, the pelvic wall will be felt nearer the side of the displacement. The cervix should be displaceable in all directions, and afford an elastic resistance that returns it to its original position.

26. The next thing to be sought is the fundus uteri. The finger tip, pressed up in the anterior fornix, should be able to palpate the anterior uterine wall far enough to determine whether or not the uterine body is situated anteriorly. In some cases it can be felt inclining over and near the anterior vaginal wall. The lateral and posterior vaginal fornices should be elastic. If the body of the uterus be displaced laterally or posteriorly, the uterine wall can be traced upward on the side of the displacement. The fornix is also shallower but wider on the side of the displacement.

The posterior fornix corresponding to the cul-de-sac of Douglas may contain the fundus uteri, the prolapsed ovaries and Fallopian tubes, a uterine or ovarian tumor, an exudate, a hematocele, prolapsed omentum, a malignant deposit, or be encroached upon by

feces in the rectum. By hooking the finger tip against the posterior vaginal wall just within the entrance and in the direction of the anus, the sphincter ani can be dilated and a small portion of the rectal mucous membrane forced into view.

27. Normal ovaries and tubes cannot, as a rule, be felt by simple vaginal indagation. If they are enlarged, prolapsed, or adherent, or the pelvic tissues abnormally relaxed, they can be felt as bean-shaped or oblong bodies, by pressing the finger beside or behind the cervix or against the lateral pelvic walls. Pelvic exudates or tumors are felt by reaching as high up as possible in front, behind, and beside the uterus.

28. In making a *digital examination of the rectum*, the finger passes through the anus forward toward the posterior vaginal wall, and impinges against the anterior rectal wall and cervix. Then the finger is turned back and follows the sacrum until it passes the so-called third sphincter. The finger can be hooked over the sacro-uterine ligaments, between which it extends, and will often find an ovary or enlarged Fallopian tube in the cul-de-sac of Douglas or in one of the lateral sacral pouches behind the broad ligaments. Exudates in the posterior pelvic region are thus palpated to much better advantage than through the vagina.

The coccyx can be grasped by the finger in the rectum and the thumb between the nates externally, and any tenderness, rigidity, ankylosis, fracture with non-union, faulty union, cartilaginous union, or displacement determined.

29. The *bimanual examination* in the dorsal position requires that one hand be placed over different portions of the lower abdomen with fingers slightly extended. The fingers are pressed gently down into the pelvis, so as to carry the organs down within better reach of the vaginal finger, and hold the abdominal walls down for palpation of

the pelvic organs against them from below. The lower hand may be either in the vagina or rectum, constituting the vaginal-bimanual and the rectal-bimanual examinations.

The fingers of the two hands may be touched (the abdominal and vaginal walls intervening) behind, beside, and in front of the uterus and moved about together until they touch the ovaries, Fallopian tubes, uterine and round ligaments, etc., or until these organs are felt to slip between them.

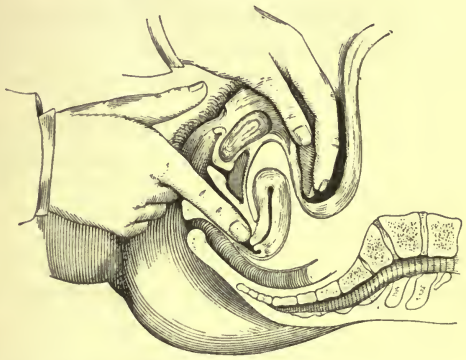

FIG. 4.—THE BIMANUAL EXAMINATION IN THE DORSAL POSTURE (*Schroeder*).

30. *Examination* in the *left-lateral* or *Sims' posture* requires that the surgeon stand at the foot of the table. The right or upper gluteal muscles are drawn up, while the forefinger is passed over the perineum to the vulvar depression at the fourchette, and then into the vagina. The parts are palpated much the same as in the dorsal postures. By pressing the other hand into the pelvic region from the abdominal walls a satisfactory bimanual examination can often be made. This posture is less disagreeable to the patient than the dorsal, particularly for rectal examinations, and may, in cases of doubtful diagnosis, supplement the other.

31. **Instrumental Examination.** The *uterine sound* is made of more or less flexible metal, usually copper, with a bulbous extremity about an eighth of an inch, or 30 mm., in diameter. The uterine probe is smaller and more flexible, usually made of silver. The hard-rubber sound (Thomas) can be made to follow a curved or irregular-shaped uterine cavity. They are liable to carry pathogenic germs to an aseptic endometrium, and should only be used after an antiseptic vaginal douche, and after wiping out and disinfecting the vaginal fornices and cervix with a 5 per cent. carbolic acid solution through the speculum.

The sound tells us the direction and length of the uterine cavity and its relation to any mass felt near the cervix. Difficulty in its passage indicates flexion, contraction, or distortion; pain and the appearance of a trace of blood denote inflammation. It is sometimes used to replace the retroverted or retroflexed uterus. For ordinary use it is curved similar to a male urethral sound, but the amount of curvature varies according to the shape and size of the uterus.

FIG. 5.—SIMPSON'S SOUND.

FIG. 6.—THOMAS'S HARD-RUBBER SOUND.

32. The *vaginal speculum* consists of one or more concave blades, used separately or jointed, and is for the purpose of exposing the vaginal walls and cervix.

33. The *single blade* or *Sims' speculum* or retractor is practically a flattened rod, bent at right angles, and made somewhat concave on the vaginal portion. As a rule, both ends are bent at right angles and of different widths, thus making a double instrument. It is used in the left-lateral

or Sims' posture. The nates are separated, the index finger placed in the concavity of the blade and introduced along the posterior vaginal wall behind the cervix. An assistant standing behind the patient then grasps the instrument firmly, and draws the posterior vaginal wall and perineum back with

Fig. 7.—Sims' Speculum.

Fig. 8.—Sims' Depressor.

the right hand, and holds the right labium and nates up out of the way with the left hand. The operator then presses the anterior vaginal wall away with a depressor, if gravity has not sufficiently done so, and draws the cervix to the vaginal entrance by means of a tenaculum.

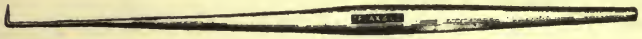

Fig. 9.—Uterine Tenaculum.

The Sims' speculum is used for sounding the uterus, inspection of the cervix and vagina, intrauterine treatment, vaginal tamponade and minor operations upon the uterus and vagina. Its use requires an assistant. Several modifications and devices for holding it are in use which enable the operator to dispense with an assistant.

34. The *bivalve speculum* consists of two blades jointed at one end, and looks and opens something like the bill of a duck. The lower blade is usually a little longer than the upper one. It is introduced in the dorsal posture

and then expanded by a screw or lever. The finger is

Fig. 10.—Exposure of Cervix with Sims' Speculum.

first introduced to discover the position of the cervix, and the speculum then passed along the finger as the latter is withdrawn, and pushed on until the end passes under the cervix. As the speculum is expanded the cervix settles on the lower or longer blade. If it does not, it may be pulled into better view by the sound introduced into the external os, or the speculum may be shifted.

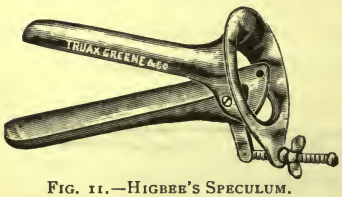

Fig. 11.—Higbee's Speculum.

Fig. 12.—Goodell's Speculum.

The bivalve does not expose the vaginal wall as well as the Sims' speculum, nor allow the cervix to be drawn as near to the vaginal

entrance. It is employed almost exclusively for inspecting the cervix, sounding the uterus, and for intrauterine treatment. It is used without an assistant.

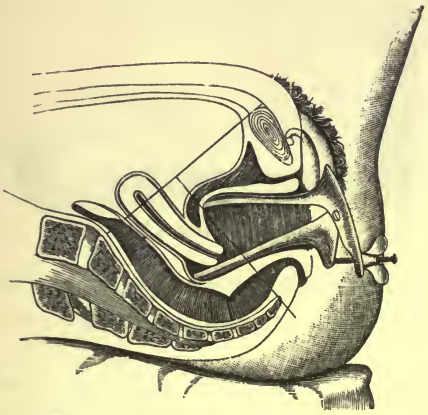

FIG. 13.—BIVALVE SPECULUM INTRODUCED.

35. The *trivalve speculum* (Nelson and Nott) has two narrow blades in place of the anterior blade of the bivalve.

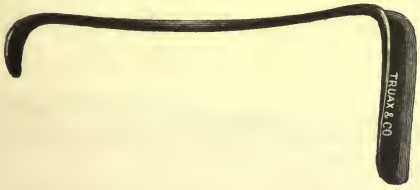

FIG. 14.—JACKSON'S PERINEAL RETRACTOR.

36. *Simon's retractors*, variously modified, are used for minor and major gynecological operations. The broad, short blade bent at a right, or at a slightly acute, angle is used in the dorsal position to retract the posterior vaginal wall, and longer, narrower ones for the anterior

and lateral walls. The cervix is pulled down by a hook or vulsellum forceps.

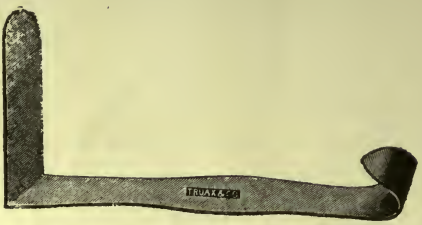

FIG. 15.—LATERAL VAGINAL RETRACTORS.

37. The *hook* and *Vulsellum forceps* are also used to draw down the cervix for a better bimanual examination.

FIG. 16.—VULSELLUM FORCEPS.

38. The *uterine dressing forceps* are ordinarily made something like a long, slender pair of scissors, with blades, shaped

FIG. 17.—UTERINE DRESSING FORCEPS.

to hold rather than to cut. They are used for wiping out the secretions with cotton, for introducing tampons, swabbing out the fornices with antiseptics, etc.

39. The *uterine applicator* is a slender, flattened, flexible silver rod, upon the end of which cotton is wrapped for the

purpose of swabbing out the endometrium or cervix with fluids.

FIG. 18.—UTERINE APPLICATOR.

40. *The uterine syringe* is a small piston syringe with a long, slender, curved nozzle for the injection of tincture of iodin or other fluids into the uterus.

FIG. 19.—BRAUN'S UTERINE SYRINGE.

When intrauterine injections are made, the cervix should be widely dilated and held so by dressing forceps or dilators while the injection is made. Otherwise uterine colic or regurgitation into the Fallopian tubes and peritoneal cavity may occur.

41. *Uterine dilators* are used for intrauterine examination, treatment, or operation. Slippery elm, sponge, seatangle, and tupelo tents are sometimes used when a patient cannot endure the pain of rapid instrumental dilatation, nor is able to take an anesthetic. (See chap. IV, par. 12.)

Tents are liable to give rise to septic infection, and must be thoroughly sterilized, used with antiseptic precautions, and not allowed to remain longer than six or eight hours. If a larger one is to follow the first, the cervix and vagina must be douched out with an efficient antiseptic before the second one is introduced.

42. The *round hard dilators* are useful for intra-uterine treatment and drainage and preliminary to Vulliet's method of dilation by gauze strips. Hard rubber, slightly conical dilators (Hanks') or steel male urethral sounds may be used, commencing with a smaller size and in-

creasing it. As these are inflexible, block tin sounds are often used, which may be bent to follow the uterine curve.

Fig. 20.—The Author's Block Tin Uterine Dilators.

43. The *bladed dilators* are for rapid dilation under anesthesia, and are used for operating rather than examining. They consist of two or three blades which form a round dilator when closed, and by means of strong handles can be separated to any required extent. If the cervix is small, lateral incisions of the cervix may follow the dilation, and thus give better access to the uterine cavity. The incision should be sewed immediately after the examination or operation.

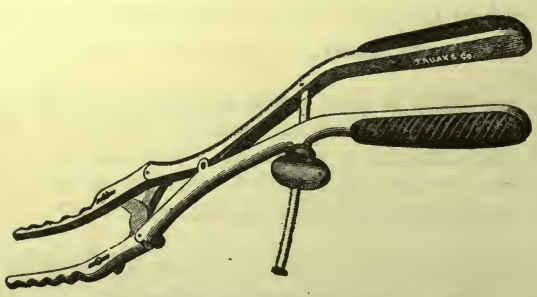

Fig. 21.—Goodell's Dilator.

The danger of bladed dilators is that they will be expanded too quickly and forcibly, and lacerate tissue. Pelvic abscess and peritonitis have often followed their careless and too vigorous use.

44. *Dilatation of the urethra* sufficient to admit the finger is effected by the round, hard dilators under anesthesia, and must be done slowly for fear of laceration and permanent impairment of its contracting power.

45. *Dilatation of the anus* is accomplished by the thumbs and fingers or large olive-shaped dilators. The half hand may be introduced, but, as a rule, two fingers will reach as far as necessary for any examination. Permanent impairment of function is liable to follow over-distention of the sphincter.

46. The *uterine scarificator* is used mainly for puncturing glandular cysts of the cervix. It is a fine rod with a spear or bayonet point. The bayonet or triangular point is preferable, as the orifice made gaps open, allows the fluid to escape better, and remains open.

FIG. 22.—THE AUTHOR'S BAYONET-POINTED SCARIFICATOR.

47. The *uterine curette* is a sound with a loop, or spoon-shaped extremity, intended to scrape out the uterine contents or even the mucous surface. For diagnosis a dull one

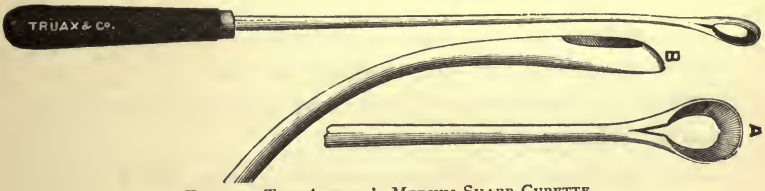

FIG. 23.—THE AUTHOR'S MEDIUM SHARP CURETTE.

is preferred, while for the operation of curetting one with a medium sharp copper edge, or even with a sharp steel edge, is employed. The cervix should always be dilated first.

48. The *aspirating syringe* is sometimes useful in drawing off fluid from cervical, retro-uterine, or vaginal cysts, etc., for diagnosis. An ordinary hypodermic syringe will often answer the same purpose.

FIG. 24.—SIMS' SHARP CURETTE.

49. The *urethral speculum* and *endoscope* can be made very useful in exploration of the urethra and bladder, provided the patient be anesthetized and the urethra well dilated. (Figs. 25 and 136.)

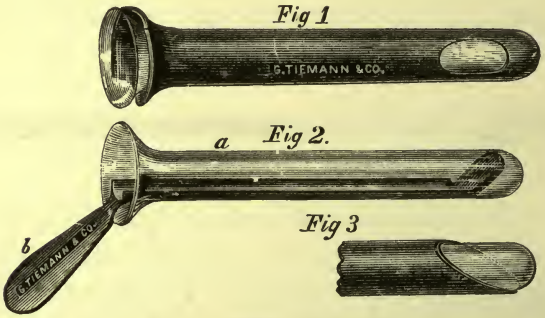

FIG. 25.—SKENE'S ENDOSCOPE.

50. *Return catheters* and *return uterine irrigating tubes* which consist of two tubes united, are valuable, but the latter may be dispensed with when the cervix is well dilated, and an ordinary glass tube be used.

51. *Examination under an anesthetic* is very often necessary for an exact diagnosis in obscure pelvic affections. The relaxation of the abdominal and perineal muscles, as well as uterine ligaments, often makes the bimanual palpation infinitely more satisfactory than without it. For dilatation

and thorough inspection of the cavities it is also invaluable. It should always be resorted to in cases of doubtful diagnosis.

CHAPTER II.

GYNECOLOGICAL TECHNIC.

ASEPTIC AND ANTISEPTIC DETAIL.

1. The practice of gynecology is largely surgical, necessitating a thorough training in surgery on the part of the gynecologist. This applies especially to the antiseptic principle. No gynecological examination or surgical maneuvers should be attempted without the employment of the most perfect antiseptic details.

2. *Perfect cleanliness or asepsis of the skin* is, for mechanical reasons, not always attainable. Germicides must therefore be used, and should be powerful enough to kill instantaneously all germs with which they come in contact. When prolonged antisepsis is to be maintained an occasional renewal of the application of the antiseptic is necessary, particularly when the skin has within a short time been exposed to the infection of the more virulent kind of microbes.

Germs sometimes lodge in minute folds of the skin or under the finger nails, or may even penetrate into the glandular or epithelial structures, and thus are not always reached either by the soap, nail-brush, or germicide. Spores may be present which develop after the antiseptic solution has been washed off. For these reasons the mechanical cleansing maneuvers with nail brush and soap are of primary importance.

3. The *antiseptics* that have been demonstrated to be the most efficient are a 1–2000 solution of corrosive mercuric

chlorid in water, and a five per cent. solution of carbolic acid. These require but a few moments' contact. Weaker solutions must be kept in contact with the hands or material to be disinfected for a much longer time and should not ordinarily be depended upon. Alcohol, spirits of turpentine, or thymol and boracic acid in solution should not be relied upon, except as makeshifts when the stronger antiseptics are contraindicated; their action, while beneficial, does not secure perfect antisepsis.

If the weaker solutions of antiseptic agents are used, and the hands or instruments become contaminated during an operation, by pus or decomposing tissues or secretions, merely dipping them into the weaker solutions at hand will not destroy the contamination quickly enough, and the antisepsis becomes imperfect.

4. *Personal cleanliness* or asepsis requires that the gynecologist take frequent warm baths and, if practicable, an occasional Turkish hot air bath, and that he keep his finger-nails short, and avoid contact with septic matter for as long a period as possible before making examinations or performing operations. The operator should wear a fresh-washed linen or white flannel suit, and clean rubber or canvas shoes. For minor operations it may answer to put a large linen gown over the ordinary clothes. The forearms should be bare.

The hands and forearms are best prepared by soaking them for five minutes in soapy water at a temperature of about 105° F., then scrubbing them with a nail brush for five minutes (in case of recent contact with sepsis for ten minutes) with green soft soap in frequent changes of water at the same temperature. They should then be scrubbed in strong alcohol for two minutes to dissolve out the remaining impurities. A 1–2000 solution of corrosive mercuric chlorid in warm water should then be rubbed into the cuticle and finger-nails for two or three minutes, and the

hands soaked in the solution for one or two minutes longer. Every half hour during a long operation, or after each contact with septic secretion, the hands should be dipped in the antiseptic solution.

When the 1–2000 corrosive mercuric chlorid or five per cent. carbolic solutions are too irritating, the hands after being washed can be scrubbed for five minutes in a 1–3000 corrosive mercuric chlorid, or 2½ per cent. carbolic acid solutions, and then from a half to one minute in the stronger solution. Another method is to soak the hands in a saturated aqueous solution of potassium permanganate until they are stained a deep mahogany red, and then in a saturated aqueous solution of oxalic acid until they are bleached again, and then in sterilized water.

5. *Instruments* and *silk ligatures* should be sterilized by being boiled in a weak solution of sodium carbonate from one-quarter to one-half hour, or by steam heat at the same temperature. *Dressings* that are not injured by heat and water may be boiled, but are better treated by steam heat and then dried by heat. *Sponges* should be lightly but thoroughly pounded to remove the sand, and thoroughly washed in warm soapsuds, soaked for 24 hours in a two per cent. solution of diluted hydrochloric acid in water, and kept in a five per cent. solution of carbolic acid until needed.

Catgut should have the fatty tissue dissolved out by being soaked for 48 hours in sulphuric ether, the ether being renewed at the end of the first 24 hours. It should then be soaked in a 1–1000 solution of corrosive mercuric chlorid in alcohol for 48 hours, with change of this solution also at the end of 24 hours. Finally it should be boiled for two or three hours in absolute alcohol, or be subjected to dry heat at a temperature of 250° F. for half an hour. It may be kept in a 1–2000 solution of corrosive mercuric chlorid in alcohol until ready for use. In order to prevent a too rapid disintegration of the catgut in the tissues, it may be

hardened by soaking 200 parts of catgut by weight from three to seven days, according to the size of the catgut, in 200 parts by weight of 95 per cent. carbolic acid, one part of chromic acid, and water 2000 parts. It is then transferred to absolute alcohol and kept in it.

Silkworm-gut sutures should be washed in warm soapsuds for five minutes, and then be kept in a 5 per cent. solution of carbolic acid in water. For ordinary abdominal sections straight glass drainage-tubes are used, resembling test-tubes, perforated near the bottom. The lumen should be less than one centimeter, or one-third of an inch in diameter. They should be boiled and kept in a 5 per cent. solution of carbolic acid. Rubber drainage-tubing should also be boiled and kept in the same solution.

FIG. 26.—GLASS DRAINAGE-TUBE FOR USE IN ABDOMINAL SECTION.

It is better to boil fresh silk ligatures each time before using, but if any be left over they can be kept for a week or so in a five per cent. solution of carbolic acid in water without material injury. Knives and needles, whose edges are injured by boiling, can be sufficiently sterilized by soaking for half an hour in five per cent. solution of carbolic acid in water before using, provided they have not previously been used in a septic case. It is better to boil or steam the instruments immediately after as well as before operations. Silkworm-gut sutures are apt to become rough and brittle by boiling, steaming, or prolonged immersion in strong mercuric solutions.

Iodoform gauze is made by soaking sterilized gauze in a one per cent. solution of carbolic acid in soapsuds in which 20 per cent. of iodoform powder is stirred. Strips three and eight cm., or one and three inches, wide, and two or three yards, or 200 or 300 cm., long should be kept in closed sterilized jars ready for use.

6. A thorough *disinfection of the patient* is necessary before performing operations in which the peritoneal cavity,

or deep connective tissue, is exposed. The clothing, the external surface of the body, the alimentary canal, the genital and urinary canals, all require attention.

Minor operations on superficial tissues do not require such extended disinfection, because the wound can be disinfected by the application of a 1–2000 corrosive mercuric chlorid solution just before the sutures are closed, or can be closed under continuous irrigation.

7. The *patient's hair* should be brushed, and then washed with a five per cent. solution of carbolic acid. A hot bath with a thorough soaping of the body, and subsequent rubbing to remove the loose cuticle and adherent secretions should be given, and the armpits, feet, and groins disinfected with the 1–2000 corrosive chlorid solution. The pubic and vulvar hair should be shaved off.

The skin over the field of the operation in abdominal sections should be thoroughly scrubbed with soap and water, then with equal parts of alcohol and ether, and a compress of soft soap put on for two or three hours. Then the soap is washed off and a compress moistened with a 1–2000 solution of corrosive mercuric chlorid is put on and kept there until the patient is on the operating table.

The nearer these preparations are to the operation the less intervening septic contact is to be feared. The attendant who prepares the patient should prepare herself first.

8. *Preparations of the alimentary canal* should be commenced from 36 to 48 hours before the operation. A laxative should be given at bedtime two nights before the day set, with the object of emptying the intestines as completely as possible the day before. Four or five grains (0.25 to 0.35 gm.) of calomel is the most efficient, and should be followed in the morning by a saline, such as half an ounce (15 gm.) of salts. Later in the day one or two stimulating enemas (glycerin and water 1–3, or equal

parts of glycerin, salts, and water). On the morning of the operation a plain water enema is given to wash out the rectum.

The calomel should produce dark green or brown evacuations. The salines should be given in quantities to produce, with the aid of the enema, from six to eight stools, and in some cases must be repeated during the day. Two or three stools do not empty the intestines sufficiently of both gases and solids for an operation during which the peritoneal cavity is to be opened, or the sphincter ani is to be sutured. Minor operations can, however, be safely performed without such vigorous laxative measures.

9. The *diet* should on the day before the operation consist mainly of liquids that contain but little fatty substances, and are easily digested, such as milk (preferably skimmed), thin gruels, and broths.

Fatty and rich foods predispose to gases particularly at a time when the duodenal secretions are being hurried through the alimentary canal. The object of such diet is to avoid as far as possible all matter that is not perfectly and completely digested or, not being perfectly digested, will leave the smallest residuum and be the least liable to undergo septic changes.

10. *Intestinal antiseptics* should be given while the laxatives are acting and the diet is being restricted. Thirty grains (2 gm.) of bismuth subcarb., and seven grains (0.50 gm.) of salol four times a day, about an hour after taking nourishment, act well. Half an ounce (15 c.c.) of brandy, and one dram (4 c.c.) of the compound tincture of cardamon, should be given as a local and general stimulant four times daily during the dieting period.

Almost any antiseptic that will not dissolve in the stomach nor depress the system may be given. The calomel given as a laxative, and the resulting increased flow of bile through the intestinal canal, also have a local antiseptic action. Resorcin grains five, or third of a gram, bismuth salicylate grains ten, or two-thirds of a gram, and various other antiseptics have been used with good effect.

11. For four hours previous to the administration of the anesthetic no fluids should be given except an ounce (32 c.c.) of brandy slightly diluted fifteen minutes before.

The brandy stimulates the circulation, and incidentally has an exhilarating effect upon the patient that makes it easier for her to submit to preliminaries.

12. The genital canal should also be disinfected. The so-called four douches are about the best, and consist first of a copious vaginal douche of hot soapsuds, secondly of a plain douche to wash out the soap, thirdly of a copious 1–2000 warm aqueous solution of corrosive mercuric chlorid, and, lastly, of a plain sterilized hot water douche to wash out the mercury. These douches should be given just before the general bath and skin disinfection, and again as near the operation as may be, and allow her time for rest before the anesthetic is administered.

Previous twice-daily sterilized hot vaginal douches for a week or so are desirable, combined, if there be no contraindication, with the daily intrauterine application of an antiseptic, such as a 1–1000 corrosive chlorid solution, a 10 per cent. solution carbolic acid in alcohol or 25 per cent. solution of ichthyol in glycerin. Before making the intrauterine application a hot douche should be given, and the fornices be swabbed out with the antiseptic.

13. A *urinalysis* should be made as soon as the operation is determined upon, and if pus or evidence of sepsis be found, the bladder should be washed out twice daily with a saturated solution of boracic acid or a normal 0.6 per cent. solution of sodium chlorid, and an ounce be left in the bladder each time. Acidity should be corrected by antacids given by mouth, such as half a dram (two gm.) of sodium bicarbonate four times daily.

A deficiency in the solids or the presence of albumin, pus, or sugar, may contraindicate either the anesthesia or the operation. Albumin and pus may forbid the administration of the anesthetic, while sugar or bile in the urine may contraindicate the operation.

CHAPTER III.

GYNECOLOGICAL TECHNIC (*Continued*).

THE ARMAMENTARIUM.

1. It is not within the scope of this manual to describe the operating room and outfit of a hospital, but to give a summary of the articles to be provided for private operations, and explain their arrangement. Systematic careful preparation is even more necessary to successful operating than unusual skill.

2. **Dressings.** The nurse should have the following dressings sterilized and ready for use in covered jars or wrapped in sterilized towels: Plain or iodoform gauze in broad layers, folded, and in strips of such width as are required for the case, absorbent cotton, a sheet, from one to two dozen soft towels, bandages, safety pins, a blanket, stockings, flannel night dresses, handkerchiefs, etc., for use about the patient. Also from six to a dozen well prepared sea sponges, or gauze pads made by sewing together several square pieces of gauze about ten centimeters, or four inches, in diameter. For abdominal sections a few large gauze pads twice this size, or large flat sea sponges, are needed to cover the intestines, and for minor operations small, crumpled or folded pieces of gauze, as well as gowns or clothing and rubber shoes for operators and nurses.

The nurse should possess a hypodermic syringe, a catheter, scissors, a clinical thermometer, a medicine graduate, a dropper, and a pair of forceps.

3. **Medicines.** Hypodermic tablets of morphia, atropia, strychnia and nitroglycerin, and some fresh tincture of digitalis, for hypodermic use. Brandy, anesthetics, solution

of ferric subsulphate, iodoform-collodion, glycerin, one pound [450 grams] of 95 per cent. carbolic acid, half a gallon [two kilos] of five per cent. tablets of corrosive mercuric chlorid, and half a gallon [two kilos] of a 1–500 solution of the corrosive chlorid. A laxative, such as sulphate of magnesia or Hunyadi Janos water, also green or washing soap, hot and cold boiled water in large quantity, eight or ten pounds [four or five kilos] of stick sulphur.

4. **Apparatus.** An operating table (preferably a narrow high one), several chairs, and two good sized, or four small, tables for instruments, sponges, solutions, etc.; oil cloths to put under and on table. A blanket or pad for table. Disinfected boilers or tin pails with covers for sterilized water. Several large jars for carbolic and mercurial solutions. Four wash basins, two pitchers, and a dipper. A thermometer to test fluids. A clean slop jar or pail. One or two fountain syringes with glass irrigating points, and a hook to hang them on. Three pans or large, deep dishes for instruments and ligatures. A vomit-bowl, gag, and tongue forceps. Bottles for hot water to be placed about patient in bed.

All apparatus, medicine bottles, furniture and woodwork of the room should be thoroughly scrubbed with soap (the walls wiped with a damp cloth), and then with a 1–2000 solution of corrosive mercuric chlorid, or five per cent. carbolic acid.

As everything is thus disinfected it is put in the cleaned operating room with all dressings. The cracks about the doors are sealed by pasting papers along them, and several pounds of sulphur are burned in a metal pot placed in a pan of water. The room is kept closed for three or more hours, and is then aired and arranged for the operation by nurses dressed in fresh, washed garments. When two nurses are

available it is better for one nurse to attend to the preparation of the room, and the other to that of the patient.

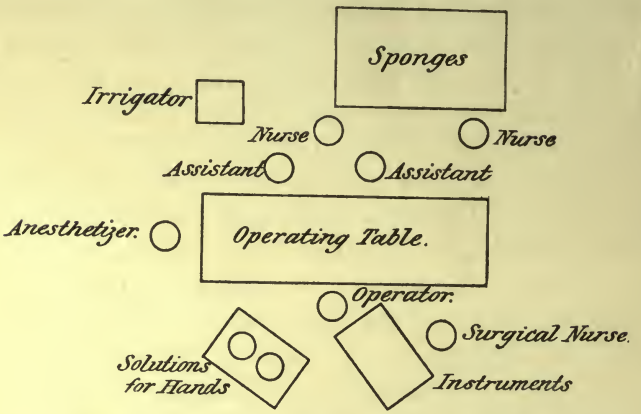

Fig. 27.—Arrangement of Tables and Assistants for Abdominal Section.

5. **Arrangement.** The table should be padded with a folded blanket, covered by waterproof material and a sheet. A piece of oiled cloth or rubber, with edges folded up, or a Kelly pad, should be placed across the center of the table in abdominal sections, or at the foot in operations about the perineum and vagina, to catch the fluids and carry them into the pail underneath.

In abdominal sections I have found the arrangement in the illustration (Fig. 27) the most convenient. The head of the patient is placed toward the window. A framework that can be placed on the table and be made to raise the lower portion of the patient's body at an angle of 45°, Trendelenburg's posture, is of great value in operations requiring work within the pelvis.

In operations about the vulva or vagina, in the dorsal posture, the knees should be held well over the body by

leg-holders (Fig. 3). The instruments should be on the operator's right side, and the sponges and irrigating bags on the left.

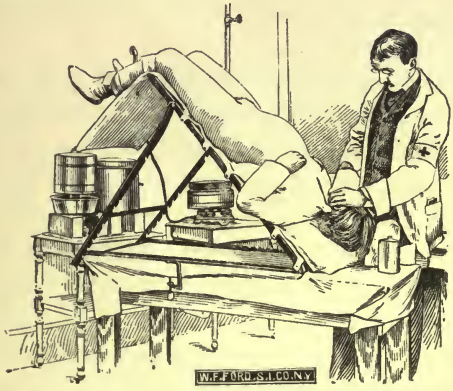

FIG. 28.—TRENDELENBURG'S POSTURE ON KRUG'S FRAME.

Plenty of assistants should be available: one for the anesthetic, two regular assistants, a nurse for the sponges, another to change water, fill bags, etc., and a nurse or assistant to look after needles, instruments, drainage tubes, gauze, etc.

Calculations should be made beforehand for every step of the operation, that it may proceed rapidly and yet without hurry or confusion.

CHAPTER IV.

GYNECOLOGICAL TECHNIC (*Continued*).

OPERATIVE DETAIL.

1. **Beginning the Operation.** When an abdominal section is about to be commenced, the antiseptic compress

is removed, the abdomen washed with equal parts of alcohol and ether, and a sterilized towel placed over the pubes, another over the chest and epigastrium, and one on each side of the abdomen, leaving a square or rectangular sterilized area of skin exposed.

When an operation about the vagina or perineum is to be done, the vulva is scrubbed with soapsuds, then with the 1–2000 corrosive mercuric chlorid solution. The vagina is douched first with plain water, then with the corrosive mercuric chlorid solution, which is rubbed into the vaginal walls and cervix with a sponge. Ordinarily the cervix should be dilated, the endometrium mildly curetted and douched out with the mercuric solution, followed by a plain, sterilized douche; or, if the occasion requires a thorough curetting, the uterus should be swabbed out with strong carbolic acid.

2. **Finishing the Operation.** At the conclusion of an abdominal section the skin about the incision should be washed off with the corrosive mercuric chlorid solution, dried and covered with narrow strips of sterilized gauze and a folded piece of gauze two inches wide be laid over that. Two or three strips of adhesive plaster are then placed across the abdomen, to hold the gauze in place and support the sutures. A layer of absorbent cotton about an inch thick, and large enough to cover the abdomen, is put over that, and a thin flannel bandage is tightly pinned around the abdomen, extending from the ribs below the trochanters. The bandage is unpinned on the eighth day for the removal of the sutures, and then replaced. The incision should henceforth be washed off daily with a 1–2000 solution of corrosive mercuric chlorid until the edges are sealed by new skin.

At operations on the vagina, long strips of iodoform gauze an inch (3 cm.) wide are pushed into it until it is loosely

filled, and are left there for 48 hours. They are then removed, and the vagina douched out with the 1–2000 corrosive chlorid solution, and after that twice or three times daily with a one per cent. solution of carbolic acid.

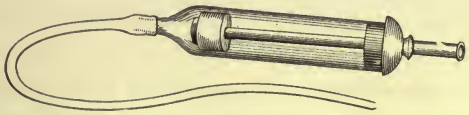

Fig. 29.—Syringe with Rubber Tube Attached for Emptying Drainage-Tube.

When a drainage-tube is used, a square piece of rubber dam one foot, or five cm., is perforated in the middle and slipped over the tube, which should barely protrude from the lower angle of the wound. The tube is then emptied by means of a glass syringe, to which a small rubber tube long enough to reach the bottom is attached, and a narrow strip of iodoform gauze carried to the bottom on a straight rod or sound. A folded piece of gauze is then put over the mouth of the tube, and the rubber dam folded and pinned over that.

The tube is emptied every hour until less than four c.c., or one dram, of fluid is found, then every two hours until it becomes clear or reduced to a few drops of pinkish serum, when it is withdrawn. The gauze on the wound is changed as often as it gets wet. Adhesive strips are not put on until the tube is out.

A *Mikulicz* drain consists of a square piece of iodoform gauze, to the center of which a sterilized string 18 inches (seven cm.) long is attached. The center of the gauze is pushed down to the surfaces to be drained, and the interior of the sac thus made is packed with strips of iodoform gauze, which, with the string and edges of the gauze sac, protrude at the lower angle of the wound. About one quarter of the strips of gauze is removed each day, and the sac on the day after. A strip of fresh gauze may be placed into the collapsing opening, and be changed every four hours until the wound is closed.

3. **Removal of Sutures.** The deep abdominal sutures should be taken out on the eighth day. The adhesive strips are cut through in the median line, their edges turned back, the gauze removed, and the incision washed off with the corrosive mercuric chlorid solution. Each suture is

pulled upon until the knot is raised, is then cut below the part that had lain above the surface, and drawn out. The incision is again washed with the antiseptic solution, covered with gauze as before, and closed by pinning the cut ends of the straps together. The superficial silk-worm-gut sutures are taken out at the end of two weeks. (See par. 2.)

Cervical and perineal sutures may be removed any time after ten days or two weeks, the former in Sims' posture, the latter in the dorsal. An antiseptic douche is given both before and after.

4. **Catheterization and the Bladder Douche.** It is inexcusable for a nurse or surgeon to introduce a catheter after an operation without the aid of sight, for if it touches the external parts infection and cystitis will probably follow. If the catheter is of rubber or metal, it should be boiled before and after introduction; if of glass (Kelly), it should either be boiled or scrubbed after use, and kept in a five per cent. carbolic solution. Sterilized vaselin, kept tightly covered, should be used as a lubricant. The vulva should be thoroughly washed before the maneuver, the hands disinfected, and the catheter and the instrument not be allowed to touch anything, not even the cleansed vulva, before passing into the urethra.

The same precautions are observed in giving the bladder douche. To the catheter should be attached a tube connected with a funnel (Skene) just before the last drops of urine escape, and the irrigating fluid be poured into the funnel. In cases of cystitis a few ounces only should be allowed to enter the bladder before the funnel is depressed low enough to allow the fluid to return into it. This fluid is poured out of the funnel, the funnel elevated and fresh fluid poured in. The bladder should thus be partly filled

and emptied six or eight times. A double irrigating catheter may also be used, one or two quarts of the fluid being passed slowly through it.

A saturated solution of boracic acid in water, or a normal (0.6 per cent.) salt solution are the best irrigating fluids, since the stronger antiseptic solutions are apt to prove irritating or toxic.

5. **Exploratory Puncture** is only permissible when a satisfactory diagnosis cannot be made without it, and when the danger of wounding large blood-vessels, or of causing an escape of the fluid into the abdominal cavity, can be excluded.

The best place, when available, is in the posterior vaginal fornix, guided by the knowledge of the location of the rectum by previous rectal indagation. The lateral fornices which are under the uterine arteries and ureter, as well as any pulsating vessels that can be felt by the examining finger, must be avoided. The four douches (chap. II, par. 12) should first be administered.

The next place to be preferred is through the distended abdominal walls, which are first washed with soap, then with alcohol and ether, and finally with the 1–2000 solution of corrosive mercuric chlorid. The nearer the umbilicus the better, except along the courses of the epigastric arteries. The median line is the least vascular place.

A small sterilized exploring needle, with suction either from a tight piston syringe, an aspirator, or Allen's pump, should be used.

6. **Tapping.** The median line, a little below the umbilicus, and, occasionally, the posterior vaginal fornix, are the places of election. The surfaces are cleansed as directed for exploratory puncture. The steps are as follows: Put patient on the back. Make an incision in the skin just long

enough to admit the trocar. Then plunge the trocar into the tumor, and conduct the fluid into a pail by means of a rubber tube previously attached to the trocar. Turn the

Fig. 30.—Trocar for Tapping the Abdomen.

patient on the side. When the fluid stops flowing, put a strip of adhesive plaster over the wound, pin a tight bandage about the abdomen, and keep her in bed two or three days.

7. **Exploratory Abdominal Incision.** The exploratory abdominal incision is usually made in the median line from about midway between the umbilicus and pubes downward about three cm., or a little over an inch, long. The preparation of the patient should be similar to that for an abdominal section (chap. II, par. 6). See par. 1 of this chapter for preliminaries.

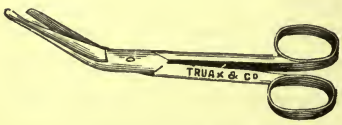

Fig. 31.—The Author's Probe-Pointed Fascia Scissors.

A free incision with bold strokes is made down to the dense fascia covering the rectus muscles. A very short, oblique incision is made through this, and if the edges of the recti muscles are not seen, the septum is sought by the probe-pointed scissors, and, when found, the fascia is slit up with them to the extent of the wound. The recti are then separated by the knife handle, and the fascia underneath is grasped by two pairs of forceps which are held by an assistant, and is drawn up and cut between them until the forceps separate widely. The cut tissues are then again slit up to the extent of the incision by the scissors, which

usually lays the peritoneum bare. This is then caught up with the forceps and carefully incised between them. As soon as it is cut through, the intestines fall away from the surface, and a small, dark hole is visible. The peritoneal opening is enlarged with the scissors or a probe-pointed bistoury. Hemostatic forceps are applied to spurting vessels. When the tissues are unusually vascular, the bladder is apt to be in the way, and should be avoided by keeping higher up.

Two fingers are introduced and the fundus uteri sought for. From the uterus the fingers trace the Fallopian tubes toward the ovaries, which may be raised to the surface.

If necessary, the incision can be enlarged upward to, or around the left side of and beyond, the umbilicus, or downward toward the pubes.

In closing the wound, silkworm-gut sutures are introduced a little less than a centimeter, or one-third of an inch, from the edge, and the same distance apart. They should embrace all of the tissues of the abdominal walls and a thin edge of the peritoneum. The rectus muscle and firm fascial layers should be held out with forceps so as to be deeply grasped, or they will not be firmly coapted, and a hernia will be liable to result. In closing a long incision I always place a row of buried silkworm-gut sutures three cm., or an inch, apart, which include only the fascia, the edges of the recti, and the peritoneum. A flat sponge is placed over the intestines under long incisions until the sutures are placed and partly tied, and when it is removed the omentum, if accessible, is drawn down in its place. After the deep sutures are tied superficial ones are placed between them, to prevent eversion of the edges.

The instruments required are, a knife, probe-pointed scissors or blunt-pointed bistoury, several hemostatic forceps, a tenaculum,

needle holder, sponge holders, tissue forceps, and needles. Silkworm-gut, gauze, adhesive plaster, sterilized cotton, and bandages are also necessary.

8. **Exploratory Vaginal Incision.** The exploratory vaginal incision is made in the posterior vaginal fornix. The preparation of the patient is the same as for an abdominal section, except the compress on the abdomen (chap. II, par. 6).

A silk ligature is passed through both lips of the cervix, and tied, for use as a tractor. The perineal retractor is introduced and the cervix drawn toward the pubes. The vaginal wall is hooked up just behind the cervix, and an incision one inch, or three cm., long made in the median line extending from the cervix downward. The connective tissue is then hooked up and snipped with the scissors, and the maneuver repeated until a hole is made in the peritoneum. This is enlarged to admit the finger. The perineal retractor is withdrawn and the forefinger introduced into the recto-uterine cul-de-sac and up behind the uterus and laterally to the ovaries. If necessary the peritoneal opening is enlarged, two fingers introduced, and the ovaries or fundus uteri are pulled down into view.

The incision may be closed by three or four catgut

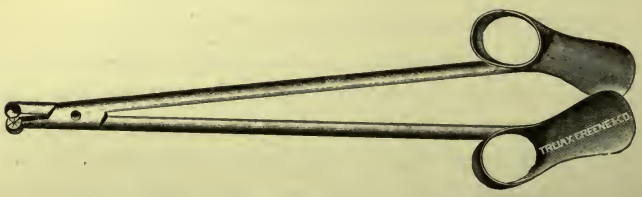

FIG. 32.—THE AUTHOR'S LONG-HANDLED NEEDLE FORCEPS.

sutures, and one of silkworm gut in the middle, including the peritoneal edges. The sutures can be introduced,

guided by the fingers or finger still in the incision, and pulling it out near the vulva, or by means of the retractors and tenacula. In the latter case a small sponge attached to a silk thread should be kept in the cul-de-sac until the sutures are ready to be tied. The vagina may be loosely packed with strips of iodoform gauze to be left for 48 hours.

The instruments required are a perineal retractor (Fig. 14), two lateral retractors (Fig. 15), a long-handled, sharp-pointed pair of scissors, a tenaculum, sponge holders, two or three pairs medium-long hemostatic forceps, long-handled needle forceps, and two or three straight needles three cm., or an inch, long. Medium-sized catgut and silkworm-gut and strips of sterilized gauze, fountain syringe, etc., should be provided.

9. **Vaginal Tamponade.** Vaginal tampons are used as the carriers of medicines, as mechanical supports to the pelvic organs, and as hemostatic agents.

When used as a *carrier of medicine*, the tampon is made of cotton or wool or gauze, large enough to cover the area to be treated. A piece of cotton or wool is folded into convenient shape, attached to a piece of thread, dipped in a mild solution of the medicine to be used, and, with the aid of a speculum, is placed under the cervix or in the upper vagina. The patient withdraws it at the end of 24 or 36 hours by means of the thread.

Some gynecologists (Engelmann) prefer to use dried medicated tampons. Others apply a powder such as boracid acid, tannin, oxid of zinc, etc., to the parts, and use a dry tampon to keep it in place. Strips of medicated gauze are sometimes used to loosely fill the vagina. Each method has its advantages in certain

Fig. 33.—Ferguson's Tubular Speculum.

cases. For applications to the cervix I prefer applying a small, moist, medicated cotton tampon under the cervix, and a dry wool tampon next to it to hold it in position.

The patient or nurse may sometimes be allowed to place it by means of a bivalve or tubular speculum.

10. As a *mechanical support* to the pelvic organs surgeon's wool is generally used. It may be cut into strips, and be introduced so as to form a column (Bozeman) of wool in the vagina, or a strip may be folded and the ends be tied. I prefer to draw out the wool into a loose layer, cut it into square, flat pieces, lay each on a thin piece of the best commercial cotton of the same size, draw the four corners together in such a way that the cotton layer will be on the outside of the ball thus produced, and then tie the four corners with a strong piece of thread long enough to hang out of the vulva. The cotton, which can be sterilized by dry heat if desirable, is less irritating to the vagina than the wool, and keeps dry longer. This is much lighter and more resilient than a wet tampon; and it is preferable to apply any medicines that may be used for the cervix and vaginal fornices on a smaller cotton tampon above or beyond it.

They can be used through a bivalve speculum, the cervix being pushed as high as necessary by them as they are being introduced. When there is, however, considerable displacement, Sims' lateral, or the knee-chest, posture, which cause the uterus to recede from the vulva, and the vagina to elongate and expand, are preferable.

11. As a *hemostatic agent* for uterine hemorrhage small pieces of cotton that have been soaked in a mild astringent solution, such as a 25 per cent. aqueous solution of ferric subsulphate (Monsel's solution) and dried. They should be introduced by means of a Sims' speculum, and be systematically placed around and under the cervix, until the

vagina is filled in such a manner that no insterstices are left between them, through which the blood can trickle. The tampon may be left for 24 hours, and then be replaced if necessary.

In cases of severe uterine hemorrhage, the cervix should be dilated, the uterus curetted and disinfected, the uterine cavity tightly packed with a thin strip of iodoform gauze, and the vaginal fornices and lower vagina carefully and solidly filled with other strips.

The rectum and bladder should be evacuated and the vagina douched with an antiseptic solution before using the tampon.

12. **Dilatation of the Cervix Uteri.** The cervix uteri may be dilated for the purpose of exploring its cavity, of establishing free drainage, or of developing a puerile cervix.

13. *Gradual dilatation* may be accomplished without an anesthetic, by means of tents and round dilators, or graded sounds.

When the cervix is very small a slender, tapering tent, five cm., or two inches long, can usually be whittled from a thick piece of slippery-elm bark that will enter without much difficulty. The surface and with it the dirt, is carefully whittled off, the tent dipped in water, and its fibers slightly crushed from end to end by successive bites of the dressing forceps in order to render it flexible. It is then curved, dipped in a five per cent. solution of carbolic acid in water, and introduced. In two or three minutes it is removed, and a larger one used in the same way. This is repeated every day or two with larger tents, or by introducing two or

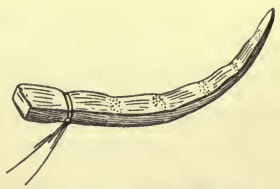

Fig. 34.—Slippery-Elm Tent Whittled from Fresh Bark.

three, side by side, until a block-tin sound, properly bent, can be introduced.

Block-tin sounds (Fig. 20) may then be used every day or two, increasing the size gradually until the limit is attained, as is indicated by the tolerance of the patient. Each dilatation must be preceded by a thorough removal of the vaginal and cervical mucus by means of cotton pledgets, and by the swabbing out of the vaginal fornices and cervical cavity (as soon as the latter is large enough) with the five per cent. carbolic acid solution.

The dilatation may be farther increased by swabbing out the uterine cavity with the five per cent. carbolic solution, and introducing a sterilized sponge tent, to be left for six or eight hours.

14. **Rapid Dilatation** may be employed if still greater distention is required. The patient is anesthetized, the vagina douched and swabbed out with a 1–2000 solution of mercuric corrosive chlorid, vaginal retractors introduced, the cervix grasped with vulsella, the tent removed, the uterus douched with the same solution, and the cervix dilated as widely as possible with Goodell's dilators (Fig. 21). If the uterus is to be explored, and the cervix shows signs of tearing before it is sufficiently dilated, its anterior or posterior wall may be cut open as far as, or beyond the vaginal junction. Some authors recommend bilateral incisions. (See part 6, chap. VIII, par. 16.)

In this way the finger can be introduced into a uterus of ordinary size, the cavity be explored, and a bimanual examination with one finger in the uterus be made.

For drainage, treatment, and development of the cervix, the dilation with the elm tents and sounds is usually sufficient. The length of time the dilatation is maintained, rather than

the amount, is of importance in stimulating the parts to increased development.

15. **Vulliet's Method.** Instead of using the sponge tents or bladed dilators, Vulliet recommends packing the uterus with pledgets of sterilized cotton, impregnated with iodoform, from the size of a pea to that of a lima-bean, which are changed and increased in quantity every second day for eight or ten times, or until the uterus will admit the finger.

These packings act as a powerful stimulant to the organ, but are liable to abrade the mucous membrane, and unless used in connection with a perfectly aseptic technic may give rise to a septic metritis and salpingitis. The method is, therefore, adapted only to hospital practice.

Rapid dilatation should not be undertaken in connection with septic inflammation of the adnexa, nor when the uterus is firmly fixed by adhesions. Dilatation of the multiparous uterus requires extra care to avoid tearing through an old cicatrix, into the parametrium or peritoneal cavity.

CHAPTER V.

THE PRINCIPLES OF GYNECOLOGICAL TREATMENT.

1. **The Hot Vaginal Douche.** Besides the antiseptic vaginal douche for surgical purposes, the medicated douche for local disease of the vagina and cervix, and the cold douche for uterine hemorrhage, all of which are described in their appropriate places, the *hot vaginal douche* from a fountain syringe is used as a remedy for pelvic congestion.

It should be taken at an uncomfortably high temperature, in order to stimulate the blood-vessels to contraction. It is best to begin at 100° F. and increase the temperature as

fast as can be tolerated, until 115° or 120° are reached. The duration should be 15 or 20 minutes at a time, the frequency from two to four times daily.

The best position is the dorsal posture, that the vagina may be filled, and the water be brought in as extensive relation as possible with the pelvic blood-vessels. The effect is prolonged if the patient remains in the recumbent position for an hour or two afterward. A normal solution of salt (0.6 per cent.) is preferable to plain water.

A douche pan, or piece of folded waterproof material, must be placed under the patient to carry the fluid into a pail beside the bed. A narrow bench with a pail under the projecting end is sometimes used. An attendant should fill the douche bag and regulate the temperature of the fluid. It is not necessary that the water should run into the vagina any faster than necessary to maintain the temperature.

2. **The Sitz-bath.** The sitz-bath may be used either for increasing or diminishing pelvic hyperemia.

When used as hot as can be borne it contracts the cutaneous vessels and favors pelvic hyperemia. The temperature should be increased from time to time in order to continue the superficial stimulation. It should be employed for 15 or 20 minutes unless a feeling of faintness makes it desirable to discontinue it before.

When used between 95° and 98° F. the sitz-bath relaxes the superficial capillaries, and thus has some effect in relieving pelvic congestion. It also reduces temperature, and has a sedative effect upon the nervous centers, promoting natural sleep. It should be continued for 15 or 20 minutes, and should be made a little warmer if the patient feels at all chilly.

When used between 80° and 90°F. for one or two minutes, followed by a rapid drying and covering of the surface, the superficial reaction has a powerful revulsive effect.

3. **Counterirritation.** Counterirritation may be transient, prolonged, or continuous. The usual places for counterirritation in gynecology are over the iliac, vesical and sacral regions.

Transient counterirritation is best produced by dipping a thin cloth in chloroform liniment, spirits of turpentine, or a mixture of one part of the oil of turpentine in twenty or thirty of hot water, applying it to the surface and covering it with flannel. In a short time the irritation becomes excessive and the compress must be removed. Such irritation is powerful, yet superficial, and can be frequently repeated.

Prolonged counterirritation may be produced by mustard or fly blisters, pustulation, or setons. These are, however, but little used in gynecology.

Continuous counterirritation is usually produced by the application once or twice daily of the pure or diluted tincture of iodin, until the applications become painful. Then they are omitted until the irritation has subsided, and used again as before, or not quite so often. In this way an almost constant counterirritation is maintained for weeks or months.

4. **Rest and Exercise.** The amount of rest and exercise taken by a patient should be carefully regulated. Convalescing patients should sit up at first for an hour at a time, and never more than two hours at a time until relieved of the acute symptoms.

In chronic cases the patient should lie down two hours in the *middle* of each day. It does more harm than good for them to arise late, or to lie down early in the forenoon, because they have been resting all night and need exercise. If, on the contrary, they wait until late in the afternoon to lie down, they will have become tired out. When possible the patient should go out for a walk after breakfast and

again in the afternoon after the mid-day rest. A sponge bath before breakfast and at bedtime in summer, replaced by light calisthenics during the winter months, are to be encouraged. The best times for hot vaginal douches are before lying down at noon and at bedtime.

Exercise during convalescence can with advantage be taken in the dorsal posture, with one-pound dumb-bells, care being taken to keep the shoulders down. Various motions of the lower limbs, one limb at a time being put through a certain motion until tired, then another motion, etc. (Skene.)

5. **Electricity.** As a general local tonic for patients that are not able to take a sufficiency of active exercise, faradic electricity is of great utility. It is given in the following manner: Place an electrode of a coarse wire short current at the patient's feet, or on the back of her neck, and the other in the hand of an attendant, who successively passes her hand over the different motor areas of the patient's body. The current should not be strong enough to cause discomfort, and should be kept up for half an hour or longer. When thus used it takes the place of exercise and predisposes to natural sleep. A strong current continued for a short time acts as a stimulant.

When it is desirable to stimulate the pelvic organs, a positive vaginal electrode may be used, the negative being applied to different parts of the body.

Intrauterine bipolar faradism is applied by means of a slender electrode containing both poles. It is used to stimulate the uterus to increased growth and function. The electrode may, after a thorough disinfection of the vagina, be used without a speculum. The current, at first mild, is gradually increased until it is as strong as it can be tolerated, continued for ten minutes and gradually turned off. It should be used every second or third day (F. H. Martin).

6. **Massage.** Patients convalescing from acute pelvic diseases are greatly benefited by general massage. It should consist of stimulating the circulation in the extremities and muscles of the back by kneading and friction motions, carefully avoiding the abdomen. The seances at first should be short and should not tire the patient too much. Later they may be continued for a half or whole hour. They should be repeated daily. Nervous patients may be treated in the evening by gentle friction movements slowly executed and with but slight pressure.

7. *Abdominal massage* for constipation (Thuré Brandt) is executed somewhat as follows :—

The masseur stands on the left side of the patient, who is lying down, and places the finger tips of both hands over the sigmoid flexure, the hands extending in opposite directions in the long axis of the patient's body. The contents of the sigmoid flexure are forced downward into the lower rectum by pressure and semicircular and stroking movements.

The hands are then placed side by side, the finger tips toward the head, and the motions are made higher up along the descending colon, with deep pressure in a downward direction in order to force the feces down into the parts previously emptied. In this way the whole colon is gone over.

Circular kneading with both hands laid on the abdomen is then practiced, avoiding the umbilical region.

Both hands are then pressed deeply into the lower abdomen, and the entire contents pressed up toward the diaphragm and gently shaken.

In obstinate cases may be added massage, in the standing position, of both costo-iliac spaces simultaneously with the palms of the hands, and kneading of the colon from the cecum toward the sigmoid flexure.

The treatment should, if necessary, consume half an hour. It should not be executed upon patients with acute pelvic inflammation or congestion.

8. *Pelvic massage* consists mainly in steadying the uterus by the finger in the vagina or rectum, and manipulating the uterus and its surroundings through the abdominal wall.

The patient takes the dorsal position on a couch. The masseur sits at her left side on a chair low enough for his left elbow to rest on his knee, while he holds the forefinger, or two first fingers, in the vagina, or the finger in the rectum with or without the thumb in the vagina. The arm should pass under her thigh. The right hand is used on the abdomen.

9. To *massage the uterus* in normal position the vaginal finger presses the cervix upward and backward and remains motionless, except gradually to change its position, and alter the direction of its pressure in supplementing the work of the other hand. The right hand makes gentle circular friction motions above the pubes and over Poupart's ligaments, gradually pressing deeper into the pelvis until the posterior surface of the uterus is reached. The uterus is then massaged by the same motions from the fundus toward the cervix for a few minutes, and stimulated by a few quick vibratory movements. Then the massage is executed over the sacro-uterine ligaments, followed by stroking movements from the uterus toward the sacrum, to empty the veins and lymphatics. The same maneuvers are executed over the broad ligaments.

The uterus may be pressed in different directions to increase its mobility or stretch old adhesions, and the vaginal finger can, toward the end, stroke the vaginal fornices from the cervix laterally and posteriorly, to assist in emptying

the vessels. The constant gentle circular motions of the abdominal hand have an anodyne effect upon the nerves, and render the manipulations much less irritating than in ordinary examinations. (Massage for special conditions will be mentioned in the appropriate places.)

10. *The ovarian regions* may be similarly massaged, without direct pressure upon the ovaries, and as the fingers come to recognize the relation of the parts old adhesions can be bimanually stretched.

11. **Pelvic Gymnastics.** Pelvic gymnastics are used to diminish or increase the flow of blood to the pelvis, and to develop the pelvic musculature.

To *diminish the flow to the pelvic organs* contractions of the muscles of the back and the abductors of the thigh are principally employed. The patient is put upon the back with the heels drawn up to the nates, and directed to raise the hips high from the couch, and separate her knees, while an attendant takes hold of them and affords resistance, and also to resist an attempt of the attendant to force them together. The patient also stands against a table and resists the attempts of the attendant to bend her body forward, etc.

To *increase the flow of blood to the pelvis* all forms of active exercise may be used, particularly the flexing and extending of the body while in a standing position, running motions of the limbs with the feet and knees moving up and down, however, instead of forward.

To *develop the pelvic muscles*, as well as to increase the flow of blood to the pelvis, forcible adduction of the thigh is employed in the dorsal position against pressure made by the patient or an assistant. She also contracts the perineum as in restraining a movement of the bowels. To lie on the back and rise to a sitting posture causes contraction of both the abdominal and perineal muscles.

12. **The Hygiene of Girlhood.** The foundation of the invalidism and unfruitfulness of American womanhood is laid in the first two decades of life. The American girl's habits are too sedentary and her activities too intellectual and emotional. The remedy lies in a reversal of these conditions.

More out-of-door exercise, more to eat, more sleep, less study, less music, less sewing, less reading, are indicated during the first decade. During the second decade a longer and easier course of instruction, with fewer hours of study and more hours of exercise, such as walking, horseback riding, astride, moderate bicycling, gymnastics, games, and housework should be the custom. It is better, physically, mentally, and morally, for a girl to complete her education at twenty-one than at eighteen, taking twice the time for her higher studies and gaining twice the time for exercise and recreation, thus establishing instead of ruining her health.

13. **Menstruation.** The girl should be forewarned, as the physical signs of puberty become evident, of the approach of menstruation; and when it appears she should understand the necessity of avoidance of fatigue or exposure to cold, as well as the manner of caring for herself. She should be taught to heed all ill feelings connected with the period, and to keep the bed if she has attacks of menorrhagia or dysmenorrhea. A large proportion of pelvic diseases are due to a want of such prudence.

Young women employed as seamstresses, clerks, and other steady occupations should remain at home two or three days at each menstrual period, in the hope of preventing the uterine disease that sooner or later overtakes them if they continue their occupation long enough.

14. **Medicines.** By far the most frequent medicines used by the gynecologist are tonics. Iron, nux vomica, cod-liver oil, hypophosphites, are the most useful.

The following are useful formulæ :—

℞. Tinct. ferri. chlor. (tasteless), ... ℥vj, 25.00 c.c.
Acidi muriat. dil. or acidi phosphor. dil., ℥ij, 8.00 c.c.
Syr. acidi citrici, ... ℥iij, 90.00 c.c.
M.

Ft. sol.

SIG.—Teaspoonful after each meal in half a tumblerful of water.

℞. Ferri proto-chloridi, ... gr. xv, 1.00 gm.
Strychninæ, ... gr. j, 06 gm.
Quin. sulph., ... ℥ss, 2.00 gm.
Extr. aloe soc., ... gr. v–xv, 0.33–1.00 [gm.
M.

Ft. pil. no. xxv.

SIG.—One after each meal.

The aloes may be omitted if the bowels are regular. A dessert-spoonful of the elixir of the chlorid, a teaspoonful of the syrup of the albuminate, or five grains (0.33 gm.) of the lactate of iron in powder or capsule, are agreeable preparations.

15. *Laxatives* are often needed until a regular daily habit can be acquired. Patients who are noticeably anemic, but digest poorly, are often benefited by three grains (0.20 gm.) of pil. hydrarg, every second night, followed the next morning by a seidlitz powder or other mild saline laxative. Anemic patients are sometimes benefited by such a dose every third night, while they are taking the tincture of iron. One grain of pil. hydrarg. (0.06 gm.) every night is an old favorite for torpid liver. The following has proved the best combination in my hands in breaking up an old habit of constipation :—

℞. Pil. hydrarg, ... ℥ss, 2.00 gm.
Podophyllin,
Aloin,
Extr. rhei,
Extr. nucis vomicæ,
Extr. belladonna, ... āā . . . gr. iv, 0.25 gm. M.

Ft. pil. no. lx.

SIG.—One or two at bedtime every night.

Two should be taken every night until the bowels act freely once every morning, then one every night as long as necessary. As a rule the effect of two pills taken nightly is somewhat cumulative, and the dose must be reduced to one, and can finally be omitted.

To insure a daily evacuation of the bowels it is necessary to fill the stomach in the morning. If the patient has no appetite for breakfast, as is usually the case, she should drink water (preferably hot) or milk, or eat fruit, either before, during, or after the meal, until she feels uncomfortably full. She should not give her attention to her morning duties or occupations until she has gone to the closet to make at least an attempt at having a passage. Abdominal massage and faradization are valuable aids if thoroughly given by an experienced attendant (par. 5 and 7).

16. *Nervous sedatives* cannot always be dispensed with. Two teaspoonfuls of the elixir of the valerianate of ammonia, or eight grains (0.50 gm.) of asafetida, are to be preferred for mental irritability. Fifteen grains (1 gm.) of ammonium bromide, or a grain (0.06 gm.) of extract of conium with five grains (0.33 gm.) of camphor in capsule may be given three or four times daily for a few days, in hysterical states. Massage, out-door exercise, general faradization, and a regulated diet should at the same time be employed. Massage or gentle faradization given at bedtime may often be made to relieve sleeplessness.

The coal tar preparations often give prompt relief in cases of headache due to cerebral hyperemia. One or two moderate doses, such as ten grains (0.66 gm.) of phenacetin, two hours apart may be given. A full dose of chloral hydrate at bedtime for one or two nights will sometimes break up an attack of sleeplessness.

It should be remembered that the stronger sedatives are debilitating, and that their use rapidly develops a desire for them. Hence they should be used sparingly, and without acquainting the patient with the name of the one used. Morphine deranges the secretions and should be reserved for pain due to organic disease, or conditions connected with loose bowels.

CHAPTER VI.

AFTERTREATMENT OF OPERATIONS.

1. **Minor Operations.** All clothes soiled during the operation should be changed, and the patient put in bed and warmed with hot-water bottles or bags placed near her, but never against the skin. She should urinate or be catheterized every six or eight hours. This should be followed immediately by a plain sterilized vaginal douche if there be sutures in the cervix or vagina, or by irrigation of the perineum if there be only external sutures. A one per cent. carbolic, or 1–4000 corrosive mercuric chlorid, douche is given every eight or twelve hours during the first two or three weeks. Silk sutures are removed in six or seven days, silkworm gut any time after two weeks.

If gauze have been left in the vagina, the douches should not be given until that has been removed (from 24 to 36 hours). Each time the patient urinates or is catheterized, three inches (8 cm.) of gauze should be pulled out of the vagina and be cut off. Gauze should be applied to the perineum and changed about every four hours. Powders and oily substances should not be used on the perineum after plastic operations. They hold the secretions, and cannot be readily washed off, and therefore become septic agents.

When the traumatism has been great, or when there is danger of hemorrhage, an ice-bag, made by gathering together the edges of a piece of oiled silk and tying them with the gathered edges up, should be kept on the abdomen for 36 hours.

2. Light diet may be allowed as soon as the nausea of the anesthetic has passed off, except after suture of the lacerated sphincter ani, when it should be of a fluid character for three or four days.

The bowels are moved on the third day; after perineor-

rhaphy for complete laceration on the second day, and each day thereafter.

The nausea, if accompanied by a sour breath, is benefited by eight grains (0.50 gm.) of sodium bicarbonate, in one ounce (30 c.c.) of water every hour or two, and perfect quiet. In extreme cases 30 grains (2 gm.) of chloral hydrate in four ounces (120 c.c.) of water by rectum, and repeated if necessary in two hours, affords relief. Nausea continuing after the influence of the anesthetic has passed off, or after the second day, is often relieved by 15 grains (1 gm.) of bismuth subnitrate every four hours.

3. **Abdominal Sections.** The patient is put to bed as directed in par. 1; if a drainage tube has been used or, if there is reason to fear hemorrhage, she is kept on the back. Otherwise the nurse may turn her on the side and change her position every two or three hours if she desires it. The patient should not turn herself nor toss in bed. She should have a pillow under her knees while on the back.

Nausea may be treated as for minor operations, par. 2. If there be danger of hemorrhage from raw surfaces, it is better to withhold fluids for ten or twelve hours. Otherwise a tablespoonful of hot water, or of equal parts of ginger ale and cold water, may be allowed every 15 or 20 minutes.

4. If there be much shock, or anemia from loss of blood a pint (500 c.c.) of normal saline solution with two ounces (60 c.c.) of whisky should be injected into the colon through a long rectal tube. A teaspoonful of brandy with eight or ten of water may also be given every hour by mouth if retained.

For extreme shock occasional whiffs of ether, and hypodermics of brandy, or nitroglycerin may be used. Fifteen minims, (1 c.c.) of tincture of digitalis with 1–30 gr. (0.0022 gm.) of strychnia may be given hypodermically, and be repeated if necessary in half an hour. Injections of

a pint (500 c.c.) of the whisky and salt solution mentioned above may be injected under the skin of the back by means of a long aspirating needle attached to the tube of a fountain syringe. The fluid is pushed beyond the needle by finger-strokes, and the position of the point is changed from time to time without withdrawing it entirely. Twice this quantity can be transfused into a vein if one can be found, or into the femoral artery through a fine needle.

An ice-bag may be required (par. 1) if there be danger of hemorrhage.

5. After operations involving the separation of adhesions and disturbance of the position of the intestines, a free movement of gas or feces through the bowels should be procured during the first 24 hours. This insures a readjustment of the intestinal coils, and removes the danger of the occurrence of intestinal paralysis or ileus if adhesions form again. As soon as the stomach will retain it, a large dose, or several small doses, of calomel or of a saline or vegetable cathartic is given, followed in three or four hours by an enema of equal parts of water, glycerin and sulphate of magnesia (Watkins), or by a pint (500 c.c.) of a two per cent. solution of inspissated oxgall in plain water, or a few ounces of the fresh oxgall. If this does not move the bowels freely, or start the passage of gas, the cathartic and the enema are repeated. Unless the intestinal canal has been opened during the operation, an opiate should *never* be given until the bowels have been moved or flatus freely passed, after which it would seldom be wanted. A mild laxative should be taken every second day, and be followed in a few hours by a plain or soap-suds enema. Painful accumulations of gas are usually relieved by an enema of one part glycerin and two of water.

In all cases in which I expect to find adhesions, I give a large dose of cascara or senna two hours before the time to give the anesthetic,

in order to stimulate the intestines to peristaltic action soon after the operation, and have found it a valuable aid in procuring a passage of rectal flatus, and in promoting the comfort of the patient.

A slight depression of temperature immediately after an abdominal section is the rule, and is usually relieved by the hot bottles or bags. A rise of temperature not exceeding 104° F. (40° C.) need not cause alarm, as it may be expected to subside within a few hours or days, according to the amount of traumatism. A rise of temperature after the first few days usually denotes a development of sepsis, and may require a secondary abdominal section, if it steadily increases and the pulse becomes rapid. If the rise takes place after the removal of a drainage-tube, the place where the tube was should be opened with a probe, or the tube should be re-introduced.

Ileus that does not yield to a brisk cathartic and stimulating enemas should be relieved by abdominal section before the pulse has become weak and thready. The operation should, as a rule, be confined to opening the wound, separating the adhesions with the fingers, and the introduction of a glass drainage-tube. Extensive manipulations among the intestines, at secondary abdominal sections, flushings, etc., are apt to cause a fatal shock, or a spread of the septic matter. A large dose of calomel, or of salts, should follow, and stimulating enemas be frequently repeated until gas passes freely per rectum, or until the bowels move.

When the bladder has been opened during the operation, a self-retaining catheter should be kept in the urethra, or the urine be drawn every three or four hours for the first four days. The drinks should be limited to the necessity of the patient, in order to prevent a large flow of urine.

When the intestines have been cut or lacerated and sutured, the bowels should be kept quiet by three or four small doses of morphine each twenty-four hours for four days, and then be moved by repeated moderate doses of salines and enemas. If the injury has been in the colon or sigmoid flexure, the enema should be a small one, such as an ounce (30 gm. or c.c.) each of salts, glycerin, and water. It is well to forcibly dilate the sphincter ani in such cases before the patient comes from under the influence of ether.

For the management of drainage see chap. IV, par 2.

6. No *nourishment* is given during the first twenty-four hours, unless it be found desirable on account of the exhausted condition of the patient to inject a pint (500 c.c.)

of beef tea, containing a half of one per cent. of salt and a dose of brandy, into the colon. During the second day a tablespoonful of barley water, or gruel, or matzoon (buttermilk), animal broth, or peptonized milk, or two tablespoonfuls of koumiss, may be given every hour. On the third day the quantity may be doubled. On the fourth or fifth day, milk-toast, chip-toast, or crackers, are allowed at meal times. After that a light diet.

The ordinary second week's diet is as follows: For breakfast, broiled or roast steak or mutton, or a soft egg, with a fruit relish (baked apple, apple sauce, orange, or juice from canned fruit), and toast or cracker, or stale bread lightly buttered. Same for noon dinner. Small dish of rice, cornstarch, or other cereal, with fruit relish and toast or cracker for supper. A glass of milk or koumiss, or a cup of thin gruel, with each meal, between each meal, at bedtime and upon awakening in the morning.

When the stomach will not retain food for several days, colonic enemas may be used every four or six hours, of a pint (500 c.c.) of equal parts of peptonized milk and a one per cent. solution of table salt with the beaten whites of two eggs. Before each enema is used, the residuum of the previous enema should be washed out with plain water.

During the third week broiled, baked or roasted beef, lamb, fish or fowl, and soft eggs are allowed morning and noon, also potatoes or light vegetables once daily, and fresh fruit without seeds. After that regular diet.

7. The patient should remain in bed for three weeks. During the latter half of the third week she may be propped up for her meals. After the third week she sits up and moves about more and more each day, and by the fourth week can walk about according to her feelings.

Ordinary duties such as housework, shopping, etc., should not be resumed until six weeks, or later if the operation has been for inflammatory conditions.

Adhesive straps extending across the abdomen, or a

snug abdominal bandage held in place by a perineal band, should be worn for three or four months.

Daily sponge baths of alcohol or warm water should be given after the first three days. After the third or fourth week, according to the condition, the patient may get into the bath tub.

8. **Vaginal Section.** The general after treatment is similar to that of abdominal section. There is seldom as much shock and reaction. No abdominal bandage is used.

If the peritoneal cavity has not been completely shut off, the patient should remain on the back for 48 hours, in order that the oozing fluids may gravitate to the vaginal opening.

The gauze packing should be removed at the end of the fourth or on the fifth day, a plain sterilized douche be given about eight hours after, and a one per cent. carbolic douche every 8 or 12 hours until the vaginal wound is completely healed.

The patient may sit up out of bed during the third week in simple cases.

When the patient urinates the protruding gauze is pushed into the vagina, and cotton smeared with vaselin temporarily put in the vaginal entrance. The end of the gauze should ordinarily protrude at the vulva and be in contact with a pad of sterilized gauze or cotton which is changed every four hours. It is well to cut off about two inches (5 cm.) after each passage of urine.

PART TWO.

DEVELOPMENT AND ANOMALIES OF DEVELOPMENT.

CHAPTER I.

DEVELOPMENT.

1. **The Wolffian Body and Müller's Ducts.** The genital organs are developed from the two longitudinal urogenital ridges which project, one on each side of the body, upon the dorsal wall into the peritoneal cavity. At the lower end of the abdomen the two ridges draw closer together, and finally come into contact with the anal region of the intestinal canal. The ridge is constituted chiefly of the Wolffian body, and it therefore contains the Wolffian tubules and the Wolffian duct. Close alongside the Wolffian duct lies Müller's duct. The essential difference between the two sexes is the change of the genital ridge into an ovary or testis. In the male the Wolffian duct becomes the genital duct, and Müller's duct remains rudimentary. In the female the Müller's duct becomes the genital duct, from which the Fallopian tube, uterus, and vagina are developed, and the Wolffian duct remains rudimentary, and persists in the genital cord as the duct of Gärtner and the parovarium. Müller's ducts unite within the genital cord into a single median duct to form the uterus and vagina; the upper or cephalic portions remain separate and form the

Fallopian tubes (Minot). The Wolffian bodies appear in the embryo about the third or fourth week.

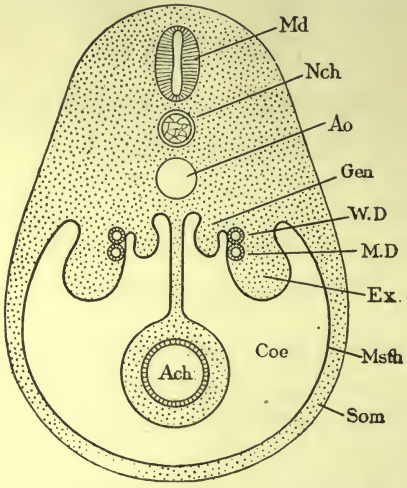

FIG. 35.—DIAGRAMMATIC CROSS-SECTION OF A VERTEBRATE, SHOWING THE FUNDAMENTAL RELATIONS OF THE UROGENITAL SYSTEM. (*Minot*)

Md. Medullary tube. Nch Notochord. Ao. Aorta. Gen. Genital ridge, later transformed into the ovary. W.D. Wolffian duct, which undergoes atrophy. M. D. Müller's duct, which becomes the uterus or vagina. Msth. The mesothelium from which the peritoneal cavity and urogenital organs originate. Coe. Cœlon, or cavities of the mesothelium. Som. Somatopleure, or body wall Ach. Archenteron, primitive canal from which the pharynx, lungs, and digestive organs are differentiated.

2. **The Ovaries.** According to Nagel, the mesothelium throws off cells at the genital ridge which assume the character of loose mesenchyma, and in which appear later large cells called the primordial cells or ova, and also the sexual cords, or Pflüger's ducts. By this proliferation of the germinal epithelium are developed the ovaries, which, as they enlarge, project more and more from the Wolffian body or future broad ligament. As Pflüger's ducts develop they include a large number of small or follicular cells which completely surround the ova, and separate them from one another and form an epithelioid layer or follicle, called

the Graafian follicle, around each ovum. They are first recognizable at the end of six weeks, and are distinguishable from the testes in the third month.

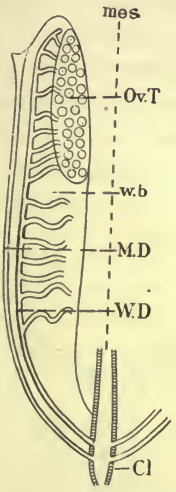

FIG. 36.—DIAGRAM OF THE INDIFFERENT STAGE OF THE UROGENITAL SYSTEM. (*Minot.*)
mes. Mesentery. Ov. T. Ovary or testicle. w. b. Wolffian body. M. D. Müller's duct. W. D. Wolffian duct. Cl. Cloaca, or terminal division of the intestines.

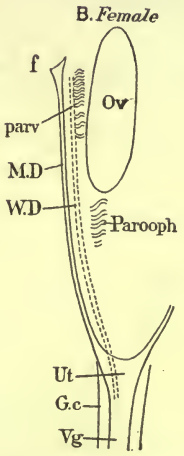

FIG. 37.—DIAGRAM OF DEVELOPMENT OF FEMALE SEXUAL APPARATUS. (*Minot.*)
W. D. Wolffian duct, atrophied. M. D. Müller's duct. G. c. Genital cord. f. Fimbriæ. parv. Parovarium or epoophoron. Ut. Uterus. vg. Vagina. Ov. Ovary. Parooph. Paroophoron.

The *broad ligament* is the "persistent urogenital fold, reduced to a relatively thin suspensory membrane by the aborted Wolffian tubules. The *parovarium*, or *epoophoron*, is formed from ten or fifteen Wolffian tubules." The *paroophoron* is the remnant of the posterior part of the Wolffian body (Waldeyer).

3. **The Genital Cord.** The genital cord is the product of the union of the lower end of the urogenital ridges. It lies between the rectum posteriorly, and the allantois anteriorly. When formed it gradually descends into the pelvis. (See par. 6.)

4. **The Fallopian Tube** is developed from that part of Müller's duct which runs along the Wolffian body, and which is not included in the genital cord below. When the Wolffian body becomes converted into the broad ligament, the Fallopian tube projects out of the edge of the urogenital fold, and after the third month changes its longitudinal course to a transverse one. It then elongates faster than the broad ligament, and assumes a tortuous or corkscrew shape.

Fig. 38.—Tortuous Course of a Fetal Fallopian Tube.

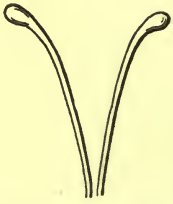

Fig. 39.—Müller's Ducts.

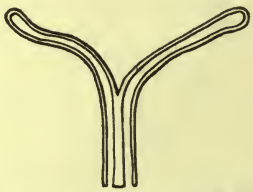

Fig. 40.—Coalescence of Ducts.

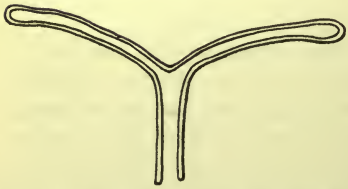

Fig. 41.—Disappearance of Septum.

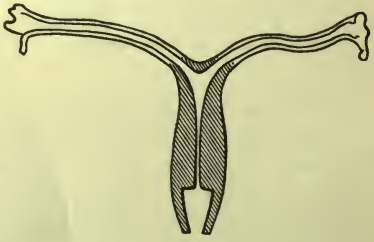

Fig. 42.—Appearance of Fundus and Cervix.

5. **The Uterus and Vagina.** After Müller's ducts have united to form the genital duct, the upper portion becomes the uterus, the lower portion the vagina (Bischoff).

Traces of the remains of the atrophied Wolffian ducts, known as Gärtner's canals, are sometimes found in the lateral walls of the uterus. The union begins at the end of the eighth week, about two-thirds of the way down the cord, and progresses simultaneously upward and downward. The union is complete by the end of the third month. At this time the epithelium of the lower third or vagina assumes the character of pavement epithelium, and passes gradually into the cylindrical epithelium of the upper portion, or uterus. The vagina is fully formed by the end of the nineteenth week.

During the sixth month an elevation corresponding to the location of the external os separates the uterus from the vagina. The mucous membranes of the vagina and cervix are thrown into longitudinal and transverse folds. The glands of the cervix appear about the middle of the fifth month, those of the uterine body and vagina not until after birth.

The hymen begins as transverse ridges on the posterior and anterior wall at the vestibule, early in the fifth month, which grow rapidly and unite at the sides. It is composed of fibrillated connective-tissue, and possesses blood-vessels and nerves. Its function is to prevent the entrance of amniotic fluid into the vagina during uterine contraction, and to keep the urine out during urination.

6. **The Development of the External Genitals.** The *allantois*, up to the time of the formation of the anus, is a prolongation of the intestinal canal. Müller's ducts open into the allantois a short distance in front of and above the anal region. On the cutaneous surface, about the fourth week, appears an elevation called the genital tubercle, in which a depression, called the anal vestibule, appears, and gradually deepens until it opens into the allantois and rectum, forming the *cloaca*. At the same time the perineal tissue between the rectum and allantois descends into the cloaca, drawing down Müller's ducts, and separating the

rectum behind from a space in front called the *urogenital sinus*. The separation is completed about the tenth week. The allantois immediately above Müller's ducts develops

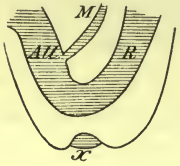

FIG. 43.
All. Allantois, which becomes the bladder later. R. Rectum. M. Müller's duct, which becomes the vagina later. *x*. The cutaneous depression that is to become the anus. (*Schroeder.*)

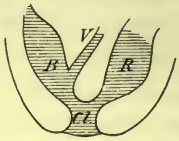

FIG. 44.—CLOACA FORMED WITH DESCENT OF THE TISSUE BETWEEN THE RECTUM AND THE ALLANTOIS.
V. Vagina. R. Rectum. B. Bladder. Cl. Cloaca. (*Schroeder.*)

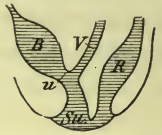

FIG. 45. — FORMATION OF UROGENITAL SINUS, Su, by descent of perineal tissue. u. Urethra. (*Schroeder.*)

into the bladder and urethra. As the urethra becomes relatively smaller and the vagina larger, the latter finally appears as if it were the continuation of the urogenital sinus. The upper end of the allantois becomes the urachus.

FIG. 46.—FORMATION OF PERINEUM AND URETHRA. (*Schroeder.*)

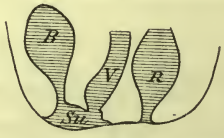

FIG. 47.—FULLY-FORMED GENITALS. The urogenital sinus forms the vestibule separated from the vagina by the hymen. (*Schroeder.*)

The *genital tubercle* develops into the clitoris and the labia minora. An elevation appears on either side of the genital tubercle about the tenth week, which develops into the labia majora. The *vulvo-vaginal* or *Bartholini's glands* are evaginations of the lower part of the urogenital sinus. They begin their development toward the end of the fourth

month (Van Ackeren). By the sixth month they measure 1 x 1.8 mm. (Geigel).*

7. **The Genital Organs at Birth.** At birth the ovaries and uterus are situated high in the pelvis, or practically in the lower abdominal cavity. The vagina extends downward behind the elevated bladder in the direction of the pelvic outlet into the vestibule. The vulvar fissure takes a more vertical direction than in the adult.

The ovaries are approximately perfect in formation, and develop a few ova, but the follicles do not ripen until puberty. The uterine body is small and not more than half the size of the approximately well-developed cervix. The vagina is well developed, but roughened on its surface by large papillæ, which are the foundation of the folds or corrugations normally present in the virgin. These papillary folds are continued as far as the internal os uteri, and become altered later into the fully-formed palmæ plicatæ. The vaginal pavement epithelium becomes transformed into the cylindrical variety in the cervix and corpus uteri, but the transition is not as sharply defined at the external os as it is in adult life. The hymen and external genitals are fully developed.

FIG. 48.—INFANTILE UTERUS. (*Schroeder.*)

The mucosa of the corpus on account of its functional requirement assumes definite characteristics toward puberty, and is more distinctly differentiated at the internal os from the cervical mucous membrane than that of the cervix is from the vagina. Pathological changes in the mucous membrane more readily pass the external os than the internal os.

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* The author has quoted freely from the descriptions in Minot's work on Embryology in the foregoing paragraphs.

CHAPTER II.

ANOMALIES OF DEVELOPMENT.

THE OVARIES AND FALLOPIAN TUBES.

1. **The Ovaries.** The ovaries may be absent, imperfectly developed, or deformed; or there may be a supernumerary ovary. Occasionally an excessive development at birth is observed.

Entire *absence* of the ovary has seldom been noticed. When it is absent there is usually an absence or a rudimentary state of the uterus. One ovary may be absent in connection with a one-horned uterus.

Rudimentary ovaries are small or flattened, and either have no Graafian follicles or only undeveloped germs of follicles; or the follicles may have developed and have disappeared. Usually there is also absence, defective formation, or imperfect development of the uterus. Idiots and cretins seem more than ordinarily subject to the deformity.

Deformities of the ovary are usually the result of constrictions partly separating a portion of it, thus producing what is called an *accessory ovary*, or giving rise to cystic degeneration.

Supernumerary ovaries are exceedingly rare. Those cases reported are usually accessory ovaries.

A *congenital descent* of the ovaries along the inguinal canal to the external ring or labium is occasionally observed.

2. **Fallopian Tubes, Uterus, and Vagina.** Certain malformations may result from imperfect formation of Müller's ducts, or from their imperfect union, or through atrophy or imperfect formation of one duct. Other malformations result from an arrest of growth after the first half of fetal life, when the organs have attained a considerable degree of normal development. The external organs may at the same time be well developed, the deformities being confined to the Fallopian tubes, uterus, and vagina.

3. **Fallopian Tubes.** The Fallopian tubes are seldom absent except in connection with a deformed uterus. The absence of one tube is almost invariably connected with a one-horned uterus. Both tubes may be represented by a slight development of connective tissue, or by a cord extending along the upper edge of the broad ligament. The persistence of the fetal characteristics is sometimes observed, the tubes being twisted and their lumen thereby constricted in places (Fig. 38). On the other hand, the tube may be abnormally large (17 cm. or nearly seven inches, in length), or may have one or more accessory ostia with fimbriæ. One tube may be longer than the other.

CHAPTER III.

ANOMALIES OF DEVELOPMENT (*Continued*).

THE UTERUS.

1. The following are the chief forms of arrested development of the uterus during the first half of fetal life :—

1. Absence of uterus, or defectus uteri.
2. Rudimentary uterus, or rudimentarius uteri.
3. The one-horned uterus, or uterus unicornis.
4. The two-horned uterus, or uterus bicornis.
5. The double uterus, or uterus duplex, or didelphys.
6. The two-chambered uterus, or uterus septus.

2. **Complete absence** of the uterus is difficult to distinguish in life from **rudimentary uterus,** and the cases are so rare that it is always presumable that the latter deformity is the one present.

By introducing the finger of one hand through the dilated urethra, and the finger of the other hand into the rectum, bringing them

together far back in the pelvis, and then drawing them forward, a small flat or pear-shaped cornuted mass will be found on the posterior surface of the bladder, from which a cord, or the resistant edge of the broad ligament, can be traced across toward the lateral pelvic walls. Sometimes a small body the size of a pea or a small bean, representing the rudimentary ovary, will be felt at one or both ends. The uterus is usually solid, but may consist of a membranous sac with or without a neck. The vagina is usually absent, or consists of a shallow depression within the vulva. Menstruation does not occur, but in case the ovaries are somewhat developed menstrual molimina may be noticeable.

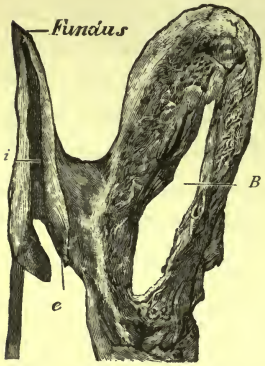

FIG. 49.—MEMBRANOUS UTERUS. (*Winckel*.)
B. Bladder. *e.* and *i.* External and internal os uteri.

3. **The One-horned Uterus** results from an arrest in the development of one of Müller's ducts before union has taken place. It is usually, but not always, fusiform, and bends laterally to join the Fallopian tube. The other horn may be absent, but is in most cases rudimentary. Pregnancy in a rudimentary horn is, as a rule, followed by a rupture of the parts, but pursues a normal course when in the larger or fully developed side.

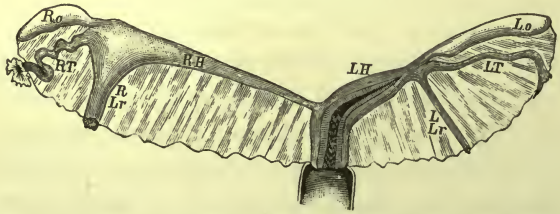

FIG. 50.—UTERUS UNICORNIS WITH RUDIMENTARY HORN. (*Schroeder*.)
L. H. Left horn. R. H. Right rudimentary horn. L o. and R. o. Left and right ovary. L. L. r. and R. L. r. Left and right round ligament. L. T. and R. T. Left and right tube.

4. **The Two-horned Uterus** is the result of a want of union of Müller's ducts immediately below those portions which normally form the Fallopian tubes. The want of union may be confined to the neighborhood of the tubes, leaving a slight depression in the fundus uteri, or it may extend lower down, dividing a large part of the uterus. A septum may or may not extend from the point of division down to, or through, the cervix, or even

FIG. 51.—UTERUS BICORNIS. (*Schroeder.*)

FIG. 52.—TWO-HORNED UTERUS WITH ONE CERVIX. (*Winckel.*)

through the vagina. The uterus planifundus or biangularis, in which the fundus is flat instead of convex, may be considered as a variety of the two-horned uterus, due to the same kind of error in development.

5. The **Double Uterus** results from a want of union of Müller's ducts as far as the vagina, in consequence of which two uteri have developed. The vagina and cervix may or

may not be double. One Fallopian tube belongs to each uterus.

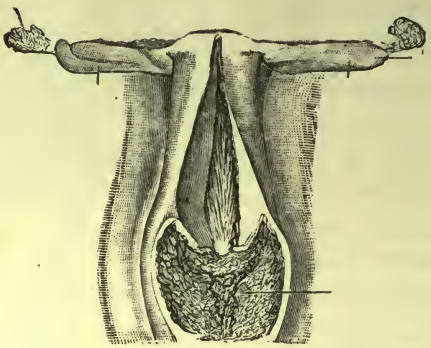

FIG. 53.—UTERUS WITH FLAT FUNDUS. (*Winckel.*)

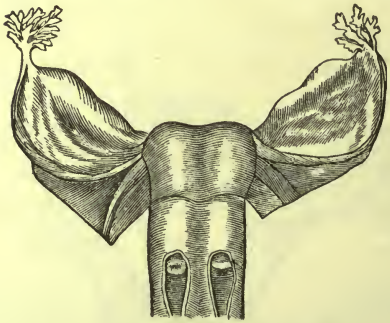

FIG. 54.—UTERUS DUPLEX. (*Thomas.*)

6. The **Two-chambered Uterus,** or *uterus septus,* results from an imperfect union of Müller's ducts. The uterus is of normal shape, but the septum has not been obliterated. The vagina is apt to be similarly divided. When the septum does not extend through the whole length of the uterus it is called *uterus subseptus;* when it extends to the internal os only it is called *uterus septus unicollis.* Occasionally the septum exists only in the cervix, or only in the cervix and vagina.

7. **The Diagnosis** of these deformities usually requires the aid of anesthesia. The bimanual examination, with the thumb in the vagina and finger in the rectum, reveals the external shape. Or the uterus may be held down by a vulsella attached to the cervix, and thus the fundus be brought within better reach of the finger in the rectum. A sound introduced into the uterus also aids the bimanual palpation. A speculum examination with the use of the sound enables us to judge of the character of the interior.

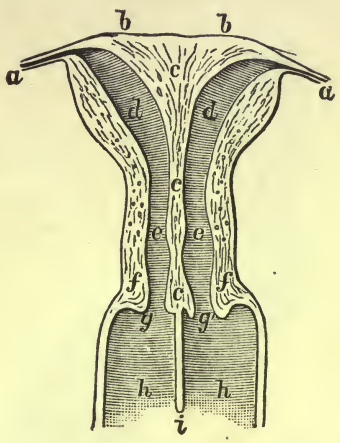

FIG. 55.—TWO-CHAMBERED UTERUS. (*Kussmaul.*)

8. **Treatment** is of no benefit except to relieve symptoms. Painful menstrual molimina in cases of absence or rudimentary development occasionally require castration for their relief.

9. The following are the chief forms of arrested development of the uterus after the first half of fetal life.

1. Fetal and infantile uterus, or uterus fœtalis and uterus infantilis.
2. Puerile uterus, or uterus pubescens.
3. Puerile cervix, or uterus parvicollis.
4. Congenital displacements.

10. **Fetal Uterus** denotes persistence of the characteristics of the uterus that belong to the latter portion of fetal life. The cervix may be long and thick, but the body is small and cylindrical, and may be solid. The cervix is

about 2.5 cm., or one inch, the uterus less than 1.25 cm., or not quite half an inch, long (Winckel). The papillary folds of the vagina extend throughout the entire canal.

FIG. 56.—FETAL UTERUS AND VAGINA. (*Winckel.*)

FIG. 57.—INFANTILE UTERUS. (*Winckel.*)
o. int. Internal os. *v. L.* Anterior lip.
h. L. Posterior lip.

11. **Infantile Uterus** denotes a persistence of the size and shape of the uterus as it was at the time of birth. The plicæ palmatæ extend high up, the cervix being almost twice the length of the corpus. The vaginal portion, however, is short. Retroversion is sometimes present. The vagina and external genital are usually small.

12. Women with such uteri seldom menstruate, or have any sexual appetite. Conception is impossible. Chlorosis, a diminutive heart, and a general hypoplasia of the vascular system are not infrequent concomitants.

The *diagnosis* is made the same as for the preceding deformities.

The *treatment* is of a general tonic and hygienic character.

13. **The Puerile Uterus** differs from the infantile uterus in that the vaginal portion, although small and conical, is longer, and the body, although small, is about as long as the cervix. The vagina and external genitals are usually proportionately small, the general appearance childish or girlish, and the health often delicate.

14. **The Puerile Cervix** has a small pin-head os, is small and conical, although sometimes flattened in shape, but may project well into the vagina. The corpus is of about normal length, but a trifle narrower and rounder than normal. In connection with anteflexion and endometritis, the cervix becomes thicker, the os is widened and sometimes slightly everted and *stenosis*, if not already present, results from the thickening of the mucous and submucous tissues.

15. The *symptoms* of these deformities are a late appearance and scantiness of the menses, particularly in the puerile uterus. Cramping pains just before the appearance of the menses, infrequent menstruation, nervous disturbances and anemia are frequently observed. Mechanical dysmenorrhea (part 3, chap. IV, par. 13) becomes the most prominent symptom as endometritis develops. Sterility is the rule.

16. The *diagnosis* of puerile uterus is made by the discovery of the small size of the uterus, the conical cervix, the narrowness of the canal and the small size of the vagina. The puerile cervix is similar, although occasionally larger from inflammation, and the corpus uteri and vagina are often quite well developed.

17. The *prognosis* is favorable if the body of the uterus is nearly normal in size and inflammation has not lasted long. When the body is puerile the sterility is apt to be permanent.

18. The *treatment* should include the administration of

tonics, and the regulation of the diet and habits. Dilatation of the cervix by slippery-elm tents, used two or three times a week with antiseptic precautions, and left each time for 18 or 24 hours, is beneficial in cases of moderate deformity. The patient withdraws it by a string attached, and immediately uses a sterilized vaginal douche. Intrauterine bipolar faradism is sometimes beneficial if persistently used. Pelvic massage may be useful as an adjuvant. (See part 1, chap. v, par. 5 to 12.)

Vulliet's method of permanent dilatation with small pieces or balls of cotton is sometimes applicable. (See part 1, chap. iv, par. 15.)

Divulsion by the forcible method recommended for anteflexion may be required for cases in which the canal is narrowed as the result of endometritis (part 6, chap. viii, par. 16. See also part 3, chap. iii, par. 17).

19. **Congenital Displacements,** particularly anteflexion, retroversion, and displacements forward, laterally and backward, may result from a want of symmetrical development of the different portions of Müller's ducts and the Wolffian bodies. Those which are of practical importance will be discussed in connection with uterine displacements (part 5, chap. ii, par. 3, and chap. iii, par. 2).

CHAPTER IV.

ANOMALIES OF DEVELOPMENT (*Continued*).

THE VAGINA AND HYMEN.

1. **The Vagina.** Deformities of the vagina may be divided into four classes.

1. Absence and rudimentary development.
2. Double or septate deformities.
3. Unilateral deformities.
4. Fetal and puerile vagina.

2. **Absence of the Vagina** occurs usually in connection with absence or rudimentary development of the uterus; but the vagina may be rudimentary when the uterus is normal.

Rudimentary Development may consist in a pouch at the cervical extremity, or a shallow sac or depression at the vulvar end, or of a closed sac in the middle portion. Or there may be perforated or closed transverse partitions of variable thickness between the two ends. Sometimes a pouch or sac above and another below overlap each other. These deformities depend either upon imperfect development of Müller's ducts, or upon diseased conditions acting after the formation of the vagina.

When the vaginal outlet is closed, the vagina occasionally has an opening into the bladder, urethra, or rectum. On the other hand, impregnation and delivery have occurred through the anus, the vagina communicating with the rectum instead of opening externally.

3. **A Double Vagina,** fully developed, is only found in connection with a double or septate uterus. When the uterus is normal, one side is always rudimentary.

A double vagina may exist with closure of the lower end of one or both sides, or a septum is sometimes found forming a lateral pouch, or partly dividing the vagina in an irregular way. One vagina may be rotated partly in front of its mate.

4. **A Unilateral Vagina** developed from one of Müller's ducts is seldom diagnosed unless in connection with a one-horned uterus, or with partial development of the other duct. Bloody cysts of the vagina may be the rudimentary

portions of the undeveloped Müller's duct (Freund). The unilateral vagina is usually narrow.

5. **Fetal and Puerile Vaginas** exist in connection with similar conditions of the uterus, although the vagina may be small with an approximately well-developed uterus.

In a few instances a ureter has been found to open directly into the vagina (L. L. McArthur).

6. The *treatment* of these conditions will be considered in connection with atresia of the genital organs.

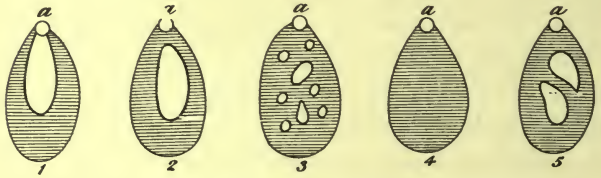

Fig. 58.—Various Forms of Hymen (Diagrammatic). (*Lewers.*)
1. Crescentic form (the most common). 2. Circular form (nearly as common). 3. Cribriform hymen. 4. Imperforate hymen. 5. Hymen biseptus. *a*, urethral orifice.

7. The **Hymen** may be absent if the lower end of the vagina be absent, or it may be double with double vagina. It may have several distinct openings, or the opening may be divided by a narrow strip of tissue (hymen septus), or there may be none (imperforate hymen).

The opening may be longitudinal or circular, and situated in the center, in the upper third or at the circumference under the urethra, all of which may be called normal. The hymen varies greatly in thickness, vascularity, and elasticity.

CHAPTER V.

ANOMALIES OF DEVELOPMENT (*Continued*).

THE VULVA.

The deformities of the vulva may be grouped under the following heads.

1. Absence of the vulva, or defectus vulvæ.
2. Rudimentary or imperfect development, or rudimentarius vulvæ.
3. Persistence of the cloaca, or atresia ani vaginalis.
4. Persistence of the sinus urogenitalis.
5. Hypospadias.
6. Epispadias.
7. Hermaphrodism.
8. Hypertrophy.

1. **Absence of the Vulva** is the result of non-development of the genital tubercle, neither the urethra, vagina nor rectum having an external opening. The separation of the allantois from the rectum in some cases has taken place, and in others has not. Under these conditions life cannot be maintained.

2. **Rudimentary** or **Imperfect Development** of the whole vulva, or of the different parts, labia majora, or minora, clitoris and perineum may exist with an opening for the sinus urogenitalis or the normal vagina.

The childish type of vulva may persist in later life.

3. **Persistence of the Cloaca,** erroneously called *atresia ani vaginalis*, and a failure of the downward growth of the perineal septum, may persist, the urethra, vagina and rectum opening into it.

4. **Persistence of the Sinus urogenitalis,** completely separated from the rectum by the formation of the perineum, has been observed. The vagina and urethra open into it. The sinus may be long and narrow and the clitoris hypertrophied, simulating male hypospadias.

5. **Hypospadias** denotes an absence of the urethra, the allantois having developed into the bladder down to its junction with the vagina. The vagina and bladder open directly into the vulva.

6. **Epispadias** is an absence of the anterior wall of the urethra. The clitoris is as a rule divided. The deformity is caused by a delay of the allantois to communicate with the external parts.

The graver form, in which the pubes are cleft and the anterior bladder wall, as well as the urethra, is absent, is not, properly speaking, a deformity of the vulva.

7. *Treatment* is of but little benefit in such deformities, except to place the rectal opening in its proper place and construct an artificial urethra from the surrounding parts.

When the rectum opens into the cloaca, a median incision in the skin between the coccyx and cloaca should be made, the rectum dissected from its lower connection, and, after being slightly twisted on its long axis, stitched to the cutaneous edges of the incision. The twist prevents the escape of feces except under pressure, and thus compensates for the want of a sphincter.

8. **Female Hermaphrodism** is a deformity of the vulva by which the male organs are simulated. As a rule, the clitoris is enlarged, and the labia are united and resemble a scrotum. The sinus urogenitalis (or the fully formed urethra and vagina) has a small opening under the clitoris, giving the appearance of a male hypospadias. The condition is merely a simulated hermaphrodism. The mammary region and general appearance are apt, like the vulva, to present characteristics of the male.

The inner genitals are often deformed, and the ovaries may have descended into the labia, giving them a still greater resemblance to a scrotum.

True hermaphrodism implies the presence of the essential organs of generation of both sexes in the same individual. It does not exist to the extent of enabling a human individual to perform the functions of both sexes, although a rudimentary ovary and testicle have apparently been found in the same body.

9. **Hypertrophy of the External Genitals** is common. The labia minora frequently attain a large size, and project like wings between the labia majora instead of being almost concealed. Among the Bushmen and Hottentots they have been known to hang down almost to the knees. Sometimes they are divided, forming two or more ridges on one or both sides of the clitoris; at other times their bases extend down and meet in front of or behind the anus.

If they cause trouble from their size, they may be clipped off and the edges be sewed up with fine silkworm-gut sutures.

The **Clitoris** may be hypertrophied with or without enlarged labia minora. In extreme cases it is one or two inches long when erect, and may interfere with coitus or with the direction of the stream of urine. In such cases it may be amputated.

CHAPTER VI.

ATRESIA AND STENOSIS OF THE GENITAL CANAL (Gynætresia).

1. **Atresia** and **Stenosis** are the result of complete or partial obliteration of a portion of the otherwise well-developed genital canal, and may be either congenital or acquired. The atresia or stenosis may be in the vulva, hymen, vagina, or at the external or internal os uteri.

2. **Pathology and Etiology.** The *congenital varieties* consist of an arrest in development in the parts in the manner already described in the preceding chapters. Imperforate hymen is the most common variety; occlusion or absence of the lower portion of the vagina next. One or more constrictions or obstructing membranes may exist in the course of the vagina. When the upper portion of the vagina is wanting, it is usually absent altogether. One or both sides of a double vagina accompanying a septate uterus may be occluded. The external or internal os uteri, or the entire cervix, may be occluded.

3. *Acquired Atresia and Stenosis* may be in the vulva as the result of adhesion of the labia following inflammation in childhood.

Ulceration, sloughing or gangrene with cicatricial contraction, whether due to disease, chemical agents, external injury or childbirth, may obliterate the vagina or cervix. Cautery and amputation of the cervix, and cervical tumors, are particularly apt to produce cervical stenosis.

A puerile cervix may, as the result of inflammation, become stenotic, or the hyperinvolution following prolonged lactation and the menopause may render the internal os too small for the free passage of the secretions.

4. **Results of Atresia.** In childhood bad effects are not noticed, except in rare instances on account of an accumulation of mucus. After puberty an accumulation of blood occurs in the parts above the place of atresia, which, by reason of absorption of the serum, shrinkage of the corpuscles, and admixture of mucus, becomes dark in color and syrupy in consistence.

When the hymen or lower end of the vagina is occluded, the accumulation is at first confined to the vagina, but later dilates the cervix (hematocolpos).

When a considerable portion of the lower vagina is occluded, the cervix becomes widely distended, and finally the internal os may be dilated. As a rule, the uterus does not become greatly expanded. The vagina undergoes hypertrophy as well as distention. When the accumulation becomes too great, rupture may take place through the hymen with relief, or through the cervix into the peritoneal cavity, or more often into the pelvic connective tissue. In the latter case an outlet may be established through the rectum, bladder, upper intestines, or external surface of the body.

When either the external or internal os is occluded, the uterine cavity becomes distended (hematometra) and globular. The uterine walls are usually hypertrophic, but may, in case the accumulation have been rapid, be very thin. When the occlusion is at the external os, the internal os is obliterated, and the cervical and uterine cavity are one. Rupture through the cervix or external os into the vagina may take place.

When the atresia is in one side of a double vagina and divided uterus, the occluded side of the uterus becomes dilated, and sometimes ruptures through the cervical septum, as this is generally the weakest place. In such a case the secretions gravitate into the vaginal pocket below, and become purulent in character.

Accumulations may take place in both sides of a double uterus and double or single vagina, with similar results as in a single uterus and vagina. This condition of affairs is very rare.

5. **Accumulations in the Fallopian Tubes** (hematosalpinx) occur not as the result of escape from the uterus, for the isthmus is usually small for some distance from the uterus, but from hemorrhage within the tubes. It is present more often when the uterus, than when the vagina only is

distended, and is probably a sort of vicarious menstruation, the result of the interference of the accumulated discharge with the normal menstrual flow.

The escape of blood from the abdominal end of the tube is hindered by the twists and constrictions in its course, which may be merely the result of shortness of the mesosalpinx, or of a persistence of the fetal type (Fig. 38). Some blood undoubtedly escapes at first from the ostium abdominale, causing a mild form of peritonitis, adhesions, and, in most cases, complete occlusion of the ostium. As the hematosalpinx increases in size these adhesions may be ruptured, causing peritonitis, or their persistence may lead to rupture of the sac and retrouterine hematocele, or even fatal peritonitis.

6. **Accumulations due to Stenosis** are usually mucus (hydrometra) or bloody, although pus may be retained in cases of malignant disease, sloughing fibroid, retained lochia, etc. The fluid is, as a rule, in the uterus, and seldom leads to a dilatation of the Fallopian tube. It does not distend the uterus as greatly as in cases of atresia, and may force an outlet at the place of constriction, and reaccumulate. In a few instances it undergoes decomposition, with formation of gas (physometra) and discharge of the latter through the vagina.

Mild forms of stenosis, with but temporary retention, are due to anteflexion, a puerile cervix, perforated vaginal septa, and adhesion of the labia. The results in such forms of cervical stenosis are inflammation of the endometrium and ovaries, and sometimes infection. The stenoses from adhesion of the labia and perforated septa seldom interfere seriously with menstruation, but they are obstacles to the performance of the marital functions.

7. *Symptoms.* The symptoms of *atresia* commence at puberty. Pelvic cramp-like pains are felt once a month, lasting for a few days, which, from month to month, gradually become more severe in character and longer in duration.

In time they become constant with monthly exacerbations and increasing interference with the evacuations of the bladder and rectum, until finally rupture takes place. The menses do not make their appearance.

After internal rupture the symptoms of peritonitis, hematocele, hematoma, or pelvic abscess supervene, according to the place of its occurrence. Rupture externally affords relief.

When one side of a double vagina and uterus is occluded

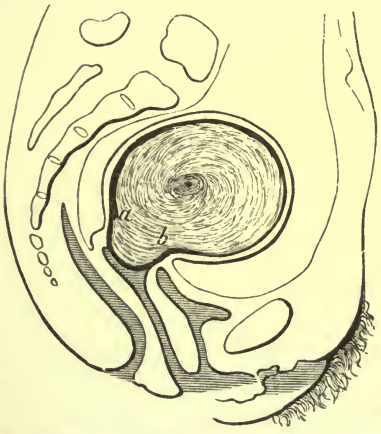

FIG. 59.—ATRESIA OF EXTERNAL OS UTERI. (*Schultze.*)

the menstrual discharge appears externally, either irregularly or at lengthened intervals. When the atresia is low down in the vagina and rupture occurs in the cervical septum, intermittent discharges of pus with symptoms of sepsis follow.

8. The symptoms of *stenosis* are usually less severe, and consist mainly of uterine colic, with or without intermittent discharges. In time the uterus, particularly the senile

uterus, loses its power of contraction and the symptoms subside.

Anteflexion with a puerile cervix gives the symptoms of mechanical dysmenorrhea (part 3, chap. IV, par. 13), with those of inflammation later.

9. **Diagnosis.** Monthly abdominal and pelvic pains in a young woman who has never menstruated lead us to suspect the trouble.

Atresia of the hymen is recognized by the bulging of a reddish or bluish mass between the labia, which can be felt as a rounded elastic tumor between the fingers of one hand on the vulva or in the rectum, and those of the other hand over the pubes. The bladder should be previously evacuated.

When the lower end of the vagina is occluded the tumor does not distend the vulva, but is felt by the rectal-bimanual palpation to extend to or into the uterus; the upper portion of the uterus, being less distended, if at all, is recognized on top of the mass. In case of hematoma or hematocele the uterus is in front or at one side of the tumor.

When the whole vagina is occluded, the enlarged globular uterus is palpated in the same way, and a space between it and the vaginal entrance is recognized by the rectal finger. It must be borne in mind that the uterus may be bicornute, and there may be a distended rudimentary horn. In the latter case the well-developed horn will also be distended and laterally situated, while the smaller accumulation in the rudimentary horn will be felt to have a pedicle arising from the neighborhood of the cervix.

When one side of a double uterus and vagina is occluded low down in the vagina, a long, cystic tumor extends along the vaginal wall, sometimes a little anterior or posterior to it instead of beside it. It may be continuous, with a similar

enlargement besides the pervious uterus, which in rare instances extends toward the other side, forming one of the horns of a two-horned uterus. Cysts of the vagina are rounder, and do not extend longitudinally as far along the vaginal canal. If the cervical septum have ruptured, the enlargement will be wanting, but a boggy mass or loose sac will be felt in the vaginal wall which, when compressed, causes pus to flow from the cervix. The speculum should be introduced, the cervix dilated, and the opening sought with the probe. Pressure on the vaginal pus sac causes the pus to appear at the opening.

When the external os is occluded, the vaginal bimanual palpation finds no vaginal portion of the cervix, the vagina leading to a round, elastic tumor occupying the position of the uterus. A cervical fibroid is known from it by the discovery of the permeable os, and by its firmer consistence. If the atresia be in one side of a two-chambered uterus and cervix, the os uteri will be discovered as a lateral crescentic slit extending part-way around the lower end of the tumor. In all cases of unilateral atresia with accumulation, menstruation will have been established.

If the internal os is occluded the round, elastic uterine tumor will be felt. Other tumors of the uterus do not produce the same roundness and elasticity in connection with amenorrhea. The sound will not pass the internal os, or if the entire cervix is occluded it will not enter the cervix.

In all cases of atresia of the whole vagina or cervix, the possibility of acccumulation in a rudimentary horn, and the probability of hematosalpinx, should lead us to carefully palpate per rectum the space behind the uterus. The dilated tubes are felt as separate but adherent enlargements, usually adherent in the pelvis. The palpation should be gentle for fear of rupturing the tubes.

10. The diagnosis of retention due to *stenosis* is more difficult, since the uterus is usually only moderately enlarged. It possesses the same elastic roundness to the touch as in atresia. The cervix is impervious to the sound, and the diseases which cause it, such as carcinoma, fibroma, or atrophy of the cervix, are present.

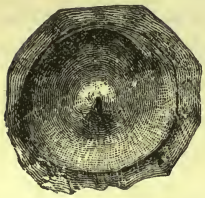

Fig. 60.—Stenosis of External Os. (*Winckel.*)

In the early stages colicky uterine pains are characteristic, and are sometimes followed by a discharge of mucus, blood, or pus from the uterus.

Stenosis of the cervix without retention is known by the character of the dysmenorrhea, the puerile condition of the cervix, the anteflexion, if it also exists, and the difficulty in sounding the uterus.

11. **The Prognosis** of atresia is unfavorable, since about 75 per cent. die if left to their fate. Atresia of the hymen and atresia in one-half of a double genital track have a more favorable prognosis, because the rupture is apt to occur externally or into the pervious side.

Stenosis seldom causes death, but is often followed by considerable inflammation of the uterus and adnexa.

12. **Treatment of Atresia.** Atresia of the hymen is best treated by a crucial incision, followed, if the membrane is fleshy, by its excision and the suture of the raw edges with fine silkworm-gut sutures.

When a small portion of the lower vagina is occluded, the septum should be punctured by a trocar, the opening enlarged by lateral incisions, and if possible the vaginal edges be brought down and stitched to the edges of the hymen or vulva. The positions of the bladder and rectum should first be determined by catheterization and rectal inda-

gation. Ordinarily the sac may be washed out with sterilized normal salt solution (0.6 per cent.) until the fluid returns clear. If the accumulation exceeds the size of a fetal head, or if the Fallopian tubes are dilated, it is better merely to make the opening and allow the fluid to escape gradually (Hofmeier, Matthews, Duncan) and wait a week—unless an odor of decomposition or septic symptoms be noticed—before enlarging and washing it out. Immediate evacuation of all of the fluid sometimes causes a rupture of peritoneal adhesions from a too rapid contraction of the tumor and descent of the uterus and tubes. If there be hematosalpinx, pressure over the abdomen should not be made.

If the atresia is in one side of a double vagina and uterus, a portion of the vaginal septum should be excised (Schroeder). If an opening already exists in the divided cervix, and pus have accumulated in the vaginal pocket, the whole vaginal septum should be slit open.

13. When a large portion or all of the vagina is absent, a transverse incision is made across the perineum and, while the bladder and rectum are guarded by the catheter in the former, and the assistant's finger in the latter, the tissues are separated with the finger-ends and scalpel handle until the accumulation can be felt, when a curved trocar is introduced. The contents are slowly evacuated and the uterus washed out thoroughly with the normal saline solution. The opening should be dilated until one or, if possible, two fingers can be introduced. It may then be packed with iodoform gauze, or a large glass drainage-tube be introduced (Breisky).

Great difficulty may be experienced in keeping the vagina open. If flaps can be brought from the vulva and stitched to the depressed edges of the sac, the difficulty will be overcome. In many cases, however, in spite of a tube and

repeated dilatations, the opening will close and the accumulation recur, and it may become necessary to arrest menstruation by an abdominal section and removal of the adnexa.

Puncture through the bladder or rectum should not be attempted. An abdominal section and complete removal of the parts, or removal of the adnexa and stitching of the uterine sac into the abdominal wound, would be preferable.

14. When the occlusion is in the cervix, and the tubes are not distended, the external os, if found, should be punctured with a trocar; if the os is not found, the trocar should penetrate well back. After that the procedure is the same as given in the preceding paragraph.

If the atresia is in the cervix of a divided uterus, the puncture is made beside the visible crescentic os.

15. When the accumulation is large and there is evidence of distention and adhesions of the tubes, it is better in the beginning to remove the adnexa by an abdominal section and evacuate from below at the same sitting. If that be impossible the sac may be removed or stitched into the abdominal wound.

16. **Treatment of Stenosis.** Adhesion of the labia in children can usually be separated by forcibly drawing them apart. If that is impossible an opening into the vagina can usually be found under the urethra, into which a curved sound can be introduced and the labia separated from within outward. In extreme cases a dissection can be made with the knife handle down upon the sound.

A rigid hymen may be ruptured by the finger, or incised in several directions; if diseased, it may be excised and the raw edges stitched together.

Septa in the vagina can be incised with a blunt-pointed bistoury guided by the finger; or the perineum can be re-

tracted and they can be cut by the aid of a tenaculum and scissors. If the septa extend across the lumen of the vagina, a bent probe should be passed through their openings as a guide.

An abnormally small vagina can usually be enlarged by tamponing it with wool or gauze, leaving the packing for 36 hours, and repeating the treatment twice or thrice weekly. At first a small tampon is used, and the size gradually increased.

Stenosis of the cervix may be treated by gradual or rapid dilation (part 1, chap. IV, par. 12 to 15).

CHAPTER VII.

CHLOROSIS (GREEN-SICKNESS).

1. Chlorosis is a disease characterized in part by deficient development of the arterial and sexual systems. The heart and arteries are small and thin-walled, and as the child grows up and attempts to assume the active duties of life, are liable to undergo degenerative changes.

The bloodmaking function is imperfect, the hemoglobin and, usually, the red corpuscles are deficient. The secretions and excretions may be faulty, entailing more or less chronic toxemia.

Puberty is ordinarily delayed, and the manifestations of the disease are apt to be more pronounced about that time. The complexion assumes a yellowish or greenish hue, the flesh is puffy, and the muscular development shows a lack of vigor. Palpitation of the heart, listlessness, and other symptoms of anemia and debility are noticeable. The

powers of endurance are feeble, although considerable mental activity, and even a taste for literary pursuits, may be developed.

2. The *treatment* consists in active but not violent out-door exercise, a limitation of mental labor, remedies to increase digestion and assimilation, plain but nourishing food, iron, arsenic, nux-vomica, sponge baths, massage, calisthenics, etc.

Chlorotic girls should not be allowed to advance too fast at school, and should abstain from physical and mental activity during the menstrual period.

The prescriptions given in part 1, chap. v, par. 14, are serviceable, also the following:—

℞. Liq. potassii arsenitis, ... ʒij, 8.00 gm.
Elixir peptenzyme, . . . ad . . . . fʒviij, 250.00 gm. M.

Sig.—Two teaspoonfuls one hour after each meal, in water.

A teaspoonful of the syrup of iodid of iron after each meal is a favorite remedy with some gynecologists. When eructations of gas and abdominal bloating are troublesome, ten grains (0.66 gm.) of peptenzyme with five grains (0.33 gm.) of salol half an hour before each meal may be useful.

The administration of oxygen and of electricity are useful as tonics as well as stimulants to functional activity.

Massage, Swedish gymnastics, calisthenics, horseback riding, bicycling, and out-of-door occupations should be recommended, according to the condition of the patient.

PART THREE.

FUNCTIONAL AND NERVOUS DISEASES.

CHAPTER I.

PUBERTY, MENSTRUATION, AND THE MENOPAUSE.

1. **Anatomy and Physiology of the Uterine Mucous Membrane.** The mucous membrane of the uterus is one millimeter ($\frac{1}{25}$ inch) thick, soft in consistence, and of a reddish gray color. It is lined with a single layer of ciliated cylindrical epithelium placed upon an imperfectly formed basement membrane, which is readily penetrated by the underlying cells. The utricular glands are numerous and branched, and are of the tubular variety. They are composed of cylindrical epithelial cells without cilia and without any appreciable basement membrane, hence these cells may be considered in direct contact with the surrounding lymphatics, blood-vessels, and intercellular amorphous substance. The glands extend almost

FIG. 61.—VERTICAL SECTION THROUGH THE MUCOUS MEMBRANE OF THE UTERUS. (*Ruge.*)

gg. Utricular glands. ct. Interglandular connective tissue. v. Blood-vessels. mm. Muscularis mucosæ. e. Cylindrical epithelium (450 x 1).

perpendicularly from the surface to the muscular walls, some of whose fibers project a short distance between them and constitute the *muscularis mucosæ*. The spaces between the glands are loosely filled with cells of embryonic connective tissue, round cells predominating near the surface and spindle cells near the muscular tissue. The spaces surrounding the glands connect with lymph-spaces in the muscular wall and through them with the lymphatics of the broad ligaments. The utricular glands are not supposed to be true secretory glands, and the mucosa has been described as a lymphatic surface rather than a true mucous membrane.

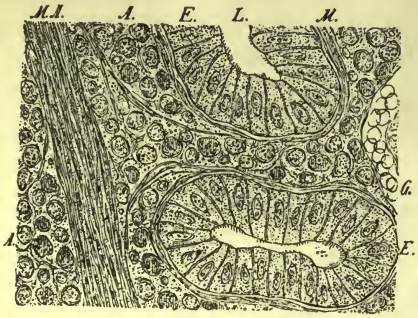

FIG. 62.—UTRICULAR GLANDS FROM THE FUNDUS UTERI OF A VIRGIN. × 400. (*Boldt.*)

MA. Muscle bundles in lymphatic tissue. *E*, *E*. Epithelial cells. *M*. Gland muscle, associated with muscular processes in lymphatic tissue. *G*. Capillary blood-vessels. *L* Lumen of utricular glands.

2. The mucous membrane of the cervical cavity is thrown into longitudinal folds, called arbor vitæ, and is lined with cylindrical epithelium which is ciliated on the edges of the folds. The glands, which are numerous, are of the compound racemose variety. The membrane, instead of being soft and in direct contact with the muscular wall, as is the endometrium, is dense and planted upon a firm base of connective tissue into which the glands deeply penetrate. The vaginal portion is covered with several layers of squamous epithelium growing upon vascular papillæ. Under certain pathological conditions cylindrical epithelium supplants the pavement epithelium around the external os,

and sometimes extends over the entire vaginal portion. In the latter case glands are found on the outer surface, although not normally there.

FIG. 63.—TRANSVERSE SECTION OF CERVIX SHOWING MUCOUS MEMBRANE. (*Cornil.*)
a. Retention cysts formed by occlusion of glands. *b*. Surface of mucous membrane. *d*. Mouth of gland. *g*. Bottom of glands. *m*. Muscular wall of cervix.

The lymphatics of the cervix connect with those in the sacro-uterine ligaments and inguinal regions.

3. The *function of the uterus* is to receive the ovum, develop it, and expel the fully-formed fetus. To this end the uterine mucous membrane undergoes a monthly development. The interglandular spaces enlarge, the round cells multiply greatly in number, and some of those nearest the epithelial surface increase slightly in size. The capillaries and lymphatics dilate and the amorphous intercellular substance becomes more abundant. As a result the mucous membrane swells from its previous thickness of one millimeter ($\frac{1}{25}$ inch) to three millimeters ($\frac{1}{8}$ inch).

When the ovum is not impregnated at the proper time this process is arrested. Uterine erection and vasomotor spasm prevent the subsidence of the congestion, and the capillaries rupture into the interglandular space. The effused blood constituents are forced through the epithelium, carrying many of the cells with them, and are expelled from the uterus mixed with these epithelial cells, granular debris, and mucus.

FIG. 64.—CERVICAL GLAND FROM THE UTERUS OF A MULTIPARA. × 400. (*Boldt.*)
B. Connective tissue. *M.* Layer of smooth muscle. *E.* Epithelial cells. *L.* Lumen of the tube.

Within ten days or two weeks from the beginning of the flow the mucous membrane returns to its normal quiescent condition, and at the end of twenty-eight days is again developed to the stage of capillary rupture. The culmination of these changes in the discharge is called menstruation. The regular time of this recurrent monthly flow is called the menstrual period; the discharge is called the menstrual flow.

On account of the large proportion of mucus in the discharge, it does not coagulate unless the quantity of the blood is relatively greater than normal. The periodicity of the flow was formerly supposed to depend upon the development and discharge of one or more ova, but the uterine changes are now thought to have a cycle of their own. Ova are supposed to discharge at or near the menstrual flow, but in many instances the Graafian follicles have been known to rupture at different periods between the menses. In about ten per cent. of healthy women the menses appear every thirty days, and in a still smaller percentage at somewhat shorter intervals.

4. **Puberty** signifies the stage of development of the sexual organs at which they are prepared to assume complete function. The age of puberty is usually between twelve and sixteen. At this time the genital organs increase rapidly in size and vascularity. The mammary glands enlarge, the pelvis broadens, and hair begins to grow on the pubes. The voice softens in tone, fat tends to accumulate on the body, and the menstrual flow makes its appearance, as the conclusive evidence of the approaching completion of the change.

The menstrual flow may begin as a normal, well-established flow that recurs monthly, or it may at first be scanty in amount, or may recur at irregular, lengthened intervals.

5. **Menstruation** has normally but few and slight symptoms. A feeling of heaviness about the pelvis, increased irritability in the pelvic organs, and some general nervous symptoms, are the most common. The flow lasts from two to six days. The amount passed varies from two to six ounces (50 to 200 c. c.).

The conditions necessary for the establishment of the normal menstrual flow must be a certain degree of general good health and development, and an adequate state of development of the sexual organs.

6. The **Menopause** signifies the cessation of active function of the sexual organs. The age of the menopause is usually about forty-five years or a little later. The genital organs decrease rapidly in size and vascularity, and their tissues become dense and rigid. The diminution and final disappearance of the menstrual flow is the most reliable evidence of the occurrence of these changes.

The menstrual flow may disappear suddenly, or may become less in amount each month, or may recur at less frequent, irregular intervals, once, twice, or many times, before entirely ceasing.

7. Normally the *symptoms* of the menopause are but slight, particularly if the flow stops by degrees, but may be pronounced if the flow stops suddenly. Leucorrhea may be present for a time. Nervous disturbances, indigestion, tympany, abdominal pains, diarrhea, intestinal congestion or hemorrhage, and other symptoms such as might be due to reflex irritation or compensatory congestions are occasionally observed.

Decided disturbances of the health at the menopause usually indicate pathological conditions of the pelvic organs.

8. The *treatment* of the symptoms attending the menopause consists mainly in the treatment of the pathological conditions upon which the symptoms depend.

When, however, the menstrual flow has been abundant and stops suddenly, the resulting disturbance may require a slight restriction in the diet and measures to stimulate the excretions, such as laxative and diuretic mineral waters, Turkish baths, massage, an increase in the amount of physical exercise, etc. A gram (15 grains) of bromid of sodium or of ammonium two or three times daily usually has a good effect upon the nervous symptoms.

9. During *pregnancy* and *lactation* the menstruation is absent, in the former during the whole term, and in the latter during the time in which the child receives all or nearly all of its nourishment from the breast.

In a few exceptional instances menstruation seems to occur for two or three times after fecundation of the ovum, but, as a rule, the discharge is not at the proper time for menstruation, although often near it, and is merely an irregular hemorrhage from the lower portion of the uterus due to pathological changes therein.

Some women menstruate regularly during lactation; others commence to menstruate after a few months; and others do not menstruate until lactation has ceased, even though it continue a year or longer.

10. On account of the unusual activity of tissue change in the sexual organs during menstruation the woman should avoid all laborious or continuous occupation at such time. She should avoid cold baths or other unusual exposure, such as getting the feet wet, sitting in drafts of cold air, etc., for fear of increasing the local congestion and thereby originating pathological changes in the uterus or its appendages.

It is usual to wear a clean washed napkin to catch the discharge, and to change it as often as it becomes moderately soaked. This is pinned to the underclothes before and behind, or to an abdominal band.

11. *Vicarious menstruation* is the name given to a bloody discharge from some portion of the body, more often from the mucous membrane of the nose, which takes the place, in whole or in part, of the uterine discharge.

12. Menstruation is a sign, or result, of physiological activity of the sexual organs, and disordered menstruation is symptomatic of pathological conditions either of the sexual or general system. Menstruation may be absent or diminished in quantity, excessive in quantity, or painful in character, giving rise to the terms *Amenorrhea*, *Menorrhagia*, and *Dysmenorrhea*.

CHAPTER II.

AMENORRHEA.

1. Amenorrhea signifies, first, an entire absence of the menstrual flow, and is then called complete amenorrhea; secondly, a less than normal amount of the discharge or a less frequent return than normal, and is then called comparative amenorrhea.

The term *primary amenorrhea* is used for cases in which the menses have never become properly established, *secondary amenorrhea* for those cases in which the menstrual flow has become established but has either completely or partially disappeared.

2. Two things are necessary for the establishment and maintenance of menstruation :—

(*a*) An adequate state of development of the sexual organs.

(*b*) A certain degree of nutrition and vigor of the general system.

3. The *causes* of amenorrhea are—

(*a*) Absence or inadequate development of the uterus or ovaries—usually congenital.

(*b*) Conditions of lowered vitality. Among such are anemia, neurasthenia, tuberculosis, and different forms of blood poisoning, whether from animal, vegetable, or chemical substances or products.

Attacks of fever, unhealthy modes of living, sea voyages, organic disease of the vital organs, and the like bring about such conditions. Obesity and plethora may indirectly or collaterally act as causes. Pregnancy is also a cause.

(*c*) Diseases of the genital organs, such as chronic metritis, chronic ovaritis, acute or chronic inflammation involving the pelvic peritoneum and connective tissue, premature atrophy of the uterus or ovaries, long-standing subinvolution, hyper-involution, large tumors, malignant disease, etc.

(*d*) Removal or mutilation of the uterus or ovaries by operation, or as the effect of injury.

Removal of the muscularis mucosæ by a sharp curette too vigorously used, or by cauterization, may act in this way.

The non-appearance of the menses due to retention within the

uterus and vagina belongs to the subject of atresia of the genital organs, not to amenorrhea (part 2).

4. **Primary Amenorrhea.** In the *diagnosis* of primary amenorrhea it is important to determine whether the condition be congenital or the result of causes acting during childhood or girlhood. When it is congenital there are no symptoms connected with it, and there may or may not be evidence of general deficiency in development, particularly of the mammary and pubic regions. An examination reveals the absence or abnormality of the internal sexual organs.

5. The general symptoms alone are often sufficient to indicate the character of the trouble. Anemic and neurasthenic girls, or those with a recognizable disease that reduces their vitality, and without signs or symptoms of pelvic disease, should be treated for those conditions before undergoing an examination. When there is no anemia or sign of profound debility, and there are decided symptoms referable to the pelvic organs, an examination becomes necessary.

6. *Remedies* must not be given merely for the purpose of producing uterine congestion and a bloody discharge, but rather for the purpose of making normal those changes in the uterus which culminate in the flow.

7. The congenital cases are, as a rule, not amenable to treatment. Cases of inadequate development either of the genital or general system may, in young subjects, be benefited by prolonged efforts directed to the improvement of the general health and vigor, and occasionally by local stimulation. When the uterus and ovaries are slightly undersized intra-uterine bipolar faradism (part 1, chap. v, par. 5) and occasional dilation of the cervix are often successful in producing a bloody flow, and sometimes in promoting the development of undersized organs.

The administration of potassium permanganate, aloes, tansy, myrrh, savine, etc., is seldom advisable, since they do but little good, and are capable of doing harm.

8. Amenorrhea due to conditions of lowered vitality calls for the use of general tonics and the inauguration of hygienic regulations. Iron, phosphorus, nux vomica, cod-liver oil and the bitter tonics are the most useful medicines. (See part 1, chap. v, par. 11 to 14.)

When there are indications of an attempt at menstruation, such as pelvic pains, or a slight bloody discharge, it is well to favor the attempt by giving hot drinks, sitz baths at a temperature of 100° F., vaginal douches (temp. 105° F.), and hot fomentations over the abdomen. Aloes, tansy, potassium permanganate, and like remedies, should not be given.

9. **Secondary or Acquired Amenorrhea.** The *diagnosis* may or may not require a physical examination, as explained in the diagnosis of *primary* amenorrhea (par. 5). When there is no anemia or sign of profound debility, and the menses, after having been perfectly regular, have suddenly remained away without accompanying symptoms, pregnancy may be suspected. The symptoms of pregnancy should then be inquired after, and possibly an examination be made.

It should be borne in mind that amenorrhea *frequently* follows conditions of lowered vitality in virgins, only *occasionally* in married nullipars, and but *seldom* in women who have borne children.

10. The *prognosis* is serious or not, according to the pathological conditions causing it. In young virgins it is more often favorable than in child-bearing women, since it may be caused by slighter ailments in the former.

11. The *treatment* must be directed not so much to the reproduction of the flow as to the pathological condition upon which the amenorrhea depends (par. 3). As

the flow has previously been established, it may be expected to return when the proper conditions for it are brought about.

12. **Suppression of the Menses.** By suppression of the menses is meant a sudden stoppage of the flow during a monthly period, or its suppression by causes working just at or before the beginning of the period. The congestion of menstruation has occurred, but the flow necessary to relieve that congestion is either insufficient for the purpose or does not take place.

13. The *cause* of acute suppression is a disturbance of the circulation from exposure to cold or over exertion, or from irritation due to other pelvic disease.

Excessive or prolonged mental emotion, or shock, may temporarily suppress the menses, but as this form is merely a part of a general suppression of function, it requires no separate treatment, and hence no separate consideration here.

14. The *pathological condition* is that of uterine and ovarian congestion followed, unless promptly relieved by an establishment of the flow, by inflammation of the uterus and sometimes of the ovaries.

15. The *symptoms* are those belonging to uterine congestion and inflammation, such as pain in the lumbar, sacral, iliac, and vesical regions, bearing down sensations in the pelvis, frequent desire to urinate, a moderate rise of the temperature, an unusually full or else a quick pulse, and perhaps some headache and general disturbances of function.

These symptoms appear at the regular time of the flow or after the flow has commenced and stopped, and in patients who before have had a normal or nearly normal amount each month.

16. The *prognosis* is bad in proportion as time has elapsed since the commencement of the symptoms. Treat-

ment instituted immediately will often start the flow and relieve the congestion. If the flow cannot be reestablished before the time of the menstrual period is over, uterine inflammation may be expected to follow.

17. The *treatment* should at first be directed to the reestablishment of the flow. To bring back the circulation to its natural channels is the most important means to this end. Warm sitz-baths (temp. 100° F.), mustard foot baths and hot drinks should be employed as soon as possible. The patient should then go to bed and use hot fomentations to the abdomen and inside of thighs for several hours. A saline cathartic and two grams (30 grains) of sodium citrate every two or three hours are helpful. After the time for the period has passed tonics, restriction of exercise, counter-irritation over the iliac regions, warm sitz baths, hot douches, and other means adapted to the relief of uterine congestion and inflammation, should be used.

In case the patient is married or has previously had a vaginal examination, the application of two or three leeches or a thorough scarification of the cervix would be indicated to diminish the uterine congestion, particularly if the above-mentioned remedies do not reproduce the flow within twelve or fifteen hours. At the next menstrual period the same means should be employed to reproduce it as were employed the month before.

CHAPTER III.

MENORRHAGIA AND METRORRHAGIA.

1. *Menorrhagia* signifies the loss of an abnormally large amount of menstrual fluid. *Metrorrhagia* signifies a hemorrhage from the uterus either at or between the regular

times for the menses, but is usually restricted to that which occurs between the periods.

As the normal amount varies in different women, the standard for each woman may be considered the amount she habitually lost when a nullipar and in good health.

2. The *causes* may be divided into local and general.

(*a*) Local. The most common local causes of menorrhagia are endometritis, intrauterine polypi, subinvolution, inflammation of the Fallopian tubes, ovaries and pelvic peritoneum, accumulations of pus in the pelvis, intrauterine neoplasms, interstitial uterine fibroids, ovarian tumors, uterine displacements, and various diseases of the pelvic and abdominal viscera. They may also cause metrorrhagia.

Malignant disease of the uterus, erosion of the cervix, retained secundines after abortion or labor, pelvic hematocele, extrauterine pregnancy, "threatened abortion" and placenta previa produce metrorrhagia.

(*b*) General. The most common general causes of both are excitement, over-exertion or exposure at, or just before, the beginning of the period, altered conditions of the blood, due to contagious, infectious, malarial, or other septic affections. Chemical poisons, and poisons due to disease of the kidneys and liver, hypertrophy of the heart and rapidly supervening plethora are occasional causes.

3. A *diagnosis* of such of the above mentioned pathological conditions as cause the menorrhagia or metrorrhagia must be made in order that its nature may be understood.

4. The *prognosis* is favorable or not, according to the curability of the cause. Sometimes the bloody flow will last during the whole of the inter-menstrual period, but as a rule it may be checked; yet it is liable to continue to recur until the cause is removed. Exceptionally death results directly from the hemorrhage. In other instances the

anemia becomes so profound after the long-continued recurrence of the affection, that the patient finally succumbs from inanition or some trivial intercurrent affection.

5. The *treatment* first of all calls for the cure or relief of the pathological condition upon which the affection depends.

The treatment of the attack requires that the patient be immediately put to bed and kept quiet. Cool acidulated drinks should be given, and all hot drinks or local applications avoided. In cases not dependent upon acute inflammatory conditions, half-teaspoonful doses of the fluid extract of ergot every hour or two is one of the most useful remedies. Sometimes half-teaspoonful doses of the aromatic sulphuric acid, well diluted, given every two or four hours, according to its toleration by the gastric mucous membrane, is helpful. Half gram doses (8 grains) of gallic acid every two hours is often used. Half-teaspoonful doses of the fluid extract of hydrastis canadensis four times daily is a slow but sometimes efficient remedy.

Frequent vaginal douches, taken at a temperature of 110 or 120° F., stop the flow after it has commenced to subside.

If the above-mentioned means fail, an ice-bag may be placed on the abdomen and kept there for twelve or twenty-four hours, with care that the cold is continuously applied. Cold vaginal douches and the introduction of ice into the vagina may be used in extreme cases.

If the case be urgent and other means fail, or if there be no time for delay, the vagina may be immediately packed with sponges or cotton pledgets that have been compressed and dried after having been soaked in a saturated solution of alum or weak solution of ferric sulphate. They should be changed every twenty-four hours. This failing, a sponge-

tent in the cervix may precede each packing, or the uterus and vagina be packed with iodoform gauze, squeezed out of diluted tincture of iodin, one to four, or out of boiled vinegar.

Should there be an intrauterine growth or inflammatory product, a curetting would be called for.

The milder remedies, such as the vegetable and mineral astringents, cinnamon, hamamelis, atropia, cannabis indica, strychnin, quinin, etc., have much less effect than those mentioned above. Opium in full doses sometimes acts well as an adjuvant. Great care must be taken in replacing the intrauterine gauze or the sponge tent within the cervix to precede it with an antiseptic vaginal and intrauterine douche, or else disastrous effects may follow.

Sponges for vaginal tamponade may be prepared by soaking them for an hour in a saturated solution of alum in water, or in Monsel's solution diluted with equal parts of water, and then squeezing out the solution and wrapping twine or tape around them in such a manner as to compress them into cylindrical or other convenient shape for introduction into the vagina. When they are dry the cord or tape is removed and all rough projections shaved off. The vagina should be filled with them.

In packing the vagina with gauze or small pledgets of cotton or wool, the material should be so placed as to leave no spaces through which the blood can trickle (part I, chap. IV, par. 11).

6. The *treatment* must sometimes be continued between periods. Iron may be required to relieve the resulting anemia, and the fluid extract of ergot can in cases of subinvolution, fibroid tumor, etc., be given for several months in doses of half or one-third of a teaspoonful after each meal, three times daily. Digitalis, strychnin, and quinin may be used to correct conditions outside of the uterus and give tone to the uterine tissues. Repeated cauterization of the endometrium by means of the positive electrode is an efficient remedy in bad cases dependent upon vascular conditions of the endometrium.

Gehrung has discovered that tamponing the vagina during each monthly period will prevent the loss of a large amount of blood without doing injury. This may be resorted to in cases of anemic patients with persistent moderate menorrhagia.

CHAPTER IV.

DYSMENORRHEA.

1. Dysmenorrhea signifies painful menstruation.

The pain may commence at any time from a week before the appearance of the flow to its disappearance, and may stop any time from the beginning of the flow to the week after it. It may last from an hour to two weeks, and vary in different cases with regard to its location and intensity.

2. It is convenient to divide dysmenorrhea into four varieties, indicative of the pathological conditions upon which it depends. Thus we have—

Neuralgic dysmenorrhea.

Inflammatory or congestive dysmenorrhea.

Mechanical dysmenorrhea.

Membranous dysmenorrhea.

Some cases represent a mixed type. Ovarian dysmenorrhea is sometimes described as a distinct variety, but according to our present state of knowledge, it cannot be said to deserve recognition separate from the inflammatory.

3. **Neuralgic Dysmenorrhea.** Neuralgic dysmenorrhea is *caused* by general rather than local pathological conditions, and usually occurs in patients of a neuralgic or rheumatic diathesis.

Anemia, hysteria, neurasthenia, indigestion, and other conditions of perverted and imperfect function are apt to be associated with this form of dysmenorrhea.

4. The *pain* appears to be independent of the character or amount of the flow. It may appear and be most intense either before, during, or after the flow, or may come and go during the whole of the time. It may be slight or may be excruciating. It varies at different monthly periods with regard to its advent, duration and intensity. Neuralgic or rheumatic pains are apt to be felt in the inter-menstrual period either in the pelvis or elsewhere.

The pain radiates from the uterine region to the iliac, abdominal, lumbar or sacral regions, and sometimes down the limbs.

It is of a neuralgic nature, and frequently seems to be made more intolerable by the nervous state of the patient. Hyperesthesia over the lower abdomen and spine are often noticeable.

5. The *diagnosis* is based upon the absence of sufficient pelvic disease to cause the trouble, upon the irregular, undulating character of the pain, and upon the presence of a neuralgic, rheumatic or neurasthenic condition.

6. The affection is often very slow to yield to treatment, and quite apt to return, but may usually be cured, or at least alleviated, in time.

7. The *treatment* must be directed to the condition of the patient rather than to that of the pelvic organs. If there be evidence of rheumatism that should be faithfully treated. In anemic and neurasthenic cases, tonics such as iron, nux vomica, phosphorus, quinin, cod-liver oil and the hypophosphites, should be persistently used. Out-door exercise, the Weir Mitchell rest treatment, a simplified but hearty diet, and particularly a change of climate have been

found to be of great benefit. The bowels should be moved freely just before the pain is to be expected. A gram (gr. 15) of phenacetin or antipyrin, repeated in two hours if necessary, often affords relief. One or two full doses of chloral hydrate, or of an opiate, may be required in some cases.

From half to one teaspoonful of the ammoniated tincture of guaiac three times daily, or as much as can be taken without causing disorder of the stomach or bowels, will help in some cases: in others 0.50 c. c. (8 minims) of the wine of colchicum seed with half a teaspoonful of the tincture of cimicifuga; in others half a gram (8 grains) of sodium salicylate every two hours may be tried. One of the first two may be given for two weeks before the expected paroxysm, or the last for three or four days before it. In plethoric patients a quarter of a gram (4 grains) of blue mass every night or two, until one or two grams (15 to 30 grains) have been taken, exerts a marked influence, particularly if the diet be well regulated, and medicines be given to relieve such gastric and intestinal disorders as may be present.

On the other hand, we must avoid giving debilitating remedies to patients whose vitality is already below par. Tonics and other measures to invigorate the system must then take precedence.

8. **Inflammatory or Congestive Dysmenorrhea.** Inflammatory dysmenorrhea is the result of inflammation within the pelvis. The endometrium is, as a rule, either primarily or secondarily in a state of inflammation or congestion. Catching cold, overexertion, or intestinal disorder sometimes brings on the trouble, or increases its severity, in patients who already have inflammatory pelvic diseases.

The principal pathological conditions are endometritis, subinvolution, salpingitis, ovaritis, chronic pelvic peritonitis and its residue, parametritis, accumulations of pus in the pelvis, submucous, uterine fibroids, and uterine displacements.

9. The *pain* is that of inflammation, and is felt as a soreness, burning, or throbbing in the pelvis or lower part of the back that may radiate up the spine, down the limbs, or

into the iliac or pelvic region. When the pain is due to uterine inflammation, it commences with the flow or as soon as it becomes well established, and may continue while the flow lasts.

An excessive or premature flow tends to relieve the pain. Sometimes the pain is paroxysmal, simulating those of mechanical dysmenorrhea, and is due to uterine contractions, which are supposed to occur during normal menstruation, but which are not painful unless there be endometritis or stenosis. (Hanfield Jones.)

When the inflammation is located in the ovaries the pain usually commences several days before the flow does, and sometimes, but not always, ceases as soon as the flow is well established. It radiates from one or both iliac regions up or down the sides of the body or into the gluteal region or thigh. The flow is often rather scanty.

Headache, nausea, nervous irritability, and some febrile reaction are present in most cases. In the intermenstrual period the patient exhibits the signs and symptoms of some form of pelvic inflammation.

10. The *diagnosis* is made from the nature of the pain, and the fact that the signs and symptoms of the pelvic inflammation or congestion are present between the periods. Unless the condition exists in connection with the mechanical variety there will usually have been a longer or shorter period in the patient's early menstrual life in which menstruation was painless.

11. The *prognosis* is favorable, but the time required for a cure is often long, and depends upon the character of the inflammation.

12. The *treatment*, of course, calls for the cure of the inflammation, which will be described elsewhere.

Something may, however, be done to relieve the pain and

thus benefit the dysmenorrhea before the radical cure is effected. The bowels should be moved freely by salines just before the attack, and the patient be put to bed and kept warm. In severe cases the abstraction of blood from the cervix by leeches or scarification the day before the appearance of the flow has an ameliorating influence. When the attack is precipitated and made worse by taking cold or by overexertion, and the flow is not free, the treatment recommended for acute suppression of the menses may be employed. In most cases counter-irritation over the lower abdomen by means of turpentine stupes followed by hot fomentations alleviates the pain somewhat.

13. **Mechanical Dysmenorrhea.** Mechanical dysmenorrhea depends upon some mechanical impediment to the function of menstruation. This impediment may be such as to prevent or interfere with the escape of the flow, or it may interfere with the normal menstrual congestion and erection of the uterus.

The escape of the discharge is rendered painful by stenosis of the external or internal os uteri, vagina, or hymen, by acute flexions, pressure of tumors situated within the cervical or lower uterine walls, or by a polypus obstructing the os.

The monthly congestion of the uterus is rendered painful by imperfect development of the whole uterus or of the cervix, or by atrophy of one of the walls due to long-standing flexion or previous inflammation, or by extreme retroflexion or retroversion of a flabby uterus. There is usually an accompanying endometritis. In either case the chief suffering is caused by painful uterine contractions.

14. The trouble has, as a rule, existed from the first, or almost the first, menstrual period. In young people the pain usually commences a few hours before the flow and

ceases as soon as the flow is established, and no pelvic discomfort is felt until a few hours before the next period. When due, however, to imperfect development of the uterus, or acute retroflexions or retroversions, it may persist nearly as long as the flow lasts.

The pain is paroxysmal in character, and when very severe may be attended by nausea. It radiates from the uterine region through the lower abdomen and inguinal region, and in a few minutes is followed by complete relief, which lasts from a fraction of an hour to an hour or two. With the subsidence of the pain an increase of the flow is usually noticed.

When this form of dysmenorrhea has lasted for several years it becomes complicated with the inflammatory variety. The pain is then paroxysmal, but it continues for some time after the flow has commenced, and is complicated by the pain of inflammation. The pain may be so severe in such cases that the patient has to keep her bed for several days.

15. The *diagnosis* is based upon the paroxysmal character of the pain, the time of its commencement and cessation, the increased flow that often appears when the paroxysm subsides, the freedom from uterine symptoms between the periods, and the fact that it has been there from almost the first menstrual period.

16. The *prognosis* is good in cases in which the uterus is pretty well developed, but almost always hopeless in those in which the uterus is defective in development. The prognosis is rendered more unfavorable by the supervention of inflammation.

17. *Treatment.* When the obstruction is due to uterine flexion, it is to be treated by forcible dilatation, according to directions given elsewhere (part 6, chap. VIII, par. 16). When it is due to the small size of the cervix or uterus, the

cervix may be dilated with graduated metal sounds or bougies, and kept dilated by the passage, twice weekly, of a sound equal to a No. 12 or 15 catheter (Fig. 20). This, if continued for many months, will do much to develop the cervix, and generally be followed by permanent relief.

Vulliet's method of keeping the uterus packed with iodoform gauze strips for several weeks, changing the packing, and increasing its amount each day, helps to develop while it dilates the uterus (part 1, chap. IV, par. 15).

Faradic electricity applied by means of vaginal or intra-uterine bipolar electrode, and in such a manner as to stimulate the uterus, has a slight effect in developing it (part 1, chap. V, par. 5).

Electrolysis for stenosis has been tried, but has not so far proven as successful as other means.

The intra-uterine steam pessary has been worn with benefit, but is now almost universally condemned on account of the danger of septic infection.

When inflammation complicates the stenosis or deformity of the uterus, curetting should accompany a forcible dilatation for flexion. Intrauterine applications should be used after each passage of the uterine sound. The antiseptic precautions given in part 1, chap. 1, par. 31, for the passage of the uterine sound must be strictly observed in using the bougie.

When the cervix is quite small a tapering bougie can be whittled out of slippery elm bark, which, after being moistened in a five per cent. solution of carbolic acid, can be slightly mashed and bent between forceps and dilator and then be introduced and left in place for a few minutes (Fig. 34). After dilating in this way for a few times a moderate-sized male steel urethral sound or flexible bougie may be used instead. (See part 2, chap. III, par. 18.)

18. For the relief of the pain hot fomentations, turpentine stupes and hot drinks are sometimes sufficient. Alcoholic stimulants, ginger, or other aromatics are often given in hot water with marked benefit. One or two full doses of belladonna sometimes act beneficially.

Alcohol and opium should not be given in ordinary cases, on account of the danger of establishing a habit. Phenacetin and antipyrin sometimes afford relief.

19. **Membranous Dysmenorrhea.** Membranous dysmenorrhea is that variety in which the paroxysm terminates in the expulsion of a membrane from the uterus. It may pass as a complete cast of the uterus or in membranous shreds. It has the characteristic formation of uterine mucous membrane, the blood-vessels, glandular openings, and interglandular substance being, however, increased in size and amount. It is thrown off as the result of hemorrhage underneath the surface (Fritsch), which cannot escape through the epithelium, usually in connection with interstitial endometritis (Gottschalk).

FIG. 65.—A DYSMENORRHEAL MEMBRANE LAID OPEN. (*Coste.*)

20. The *pain* commences with the flow, comes on in paroxysms, as in mechanical dysmenorrhea, and increases in severity until it finally resembles labor pains. After a

few hours or days the membrane is shed and the pain ceases to return. This is commonly followed by a free flow of blood for a short time.

The pain in most cases is excruciating, and the effect upon the health of the patient quite disastrous, being increased by the large amount of anodynes she is obliged to take for relief.

21. The *diagnosis* depends upon the discovery of the characteristic membrane in the discharge. The signs and symptoms of both mechanical and inflammatory dysmenorrhea are also present.

22. The *prognosis* is usually favorable, although the cure is a long and difficult one.

23. The *treatment* must be directed to the cure of the uterine inflammation. Repeated dilatation and curetting of the uterus has given the best results.

The treatment of the paroxysm consists in giving opiates or anesthetics together with hot drinks, hot local applications, and turpentine stupes over the abdomen.

24. In some cases of dysmenorrhea of mixed origin all treatment will fail to be of benefit, and it may become necessary to remove either the uterus or ovaries in order to save the patient from a life of invalidism and a premature death.

CHAPTER V.

STERILITY.

1. Sterility or barrenness in woman signifies an inability to bring forth a living, viable offspring.

There are three kinds of sterile women, viz.: those who are past the age of puberty, but have never been able to

conceive; those who have conceived but, although not beyond the menopause, are no longer able to; and those who conceive, but are still unable to bring forth a living, viable offspring.

2. The *causes* may be general or local.

The general causes are,

(*a*) A lowered state of the general vitality from disease, starvation, excessive "wear and tear" of the system, etc.

(*b*) A depressed state of the nervous system suspending the function of ovulation, such as misfortune, prolonged grief, neurasthenia, etc.

(*c*) Disordered states of the system interfering with the functions of the body, such as gout, rheumatism, excessive obesity, etc.

The local causes are,

(*a*) Absence or deficient development of some portion of the genital tract.

(*b*) Stenosis of some portion of the genital canal.

(*c*) Displacement or malformation of one or more of the genital organs, such as acute uterine flexions, or displacements by tumors, elongated cervix, imperforate hymen, etc.

(*d*) Disease of the genital organs, such as the different forms of inflammations of the vagina, uterus, Fallopian tube and ovaries, hyperinvolution, degeneration and premature atrophy of the ovaries, accumulations of pus in the pelvis, etc.

(*e*) Tumors, carcinoma, sarcoma, papilloma, uterine polypi, genital tuberculosis and other kinds of infection localized in the pelvis.

A thick plug of mucus in the cervical canal is supposed to act as a mechanical cause of sterility, but in such cases I have usually found sufficient inflammation either of the uterus or ovaries to prevent conception.

3. The *diagnosis* consists in the discovery of the conditions that cause the sterility.

When the patient has never menstruated, the condition is apt to be one of absence or deficient development of the organs. When she has always had pain just before, or at the beginning of the menstrual period, we usually find cervical stenosis from anteflexion, deficient development, or some other displacement or malformation. When the patient has borne children, or menstruates without the initiatory pain, inflammation or some other local disease should be looked for.

The possibility of impotency in the husband must not be overlooked. It is present in from five to ten per cent. of cases.

4. The *prognosis* depends upon the curability of the cause.

Absence or deficient development of the genitals usually affords a hopeless prognosis. Stenosis and displacement affect the prognosis unfavorably in proportion as they are of long standing, women under twenty-five years being often cured of their sterility, those over thirty but seldom. The diseases of the genital organs are often all cured, or supposed to be cured, without removing the sterility that seems to be caused by them.

5. The *treatment* consists in removing all of the conditions upon which the sterility depends, and will be found in the chapters devoted to these subjects.

Conditions of general debility and depression should be remedied. The cervix, if small or malformed, should be kept dilated as well as possible, and displacements of the uterus should be corrected as is directed elsewhere.

Fig 66.—Outerbridge's Speculum.

The intra-uterine stem pessary has been known to cure some cases of sterility. Outerbridge's intra-uterine speculum has accomplished similar results. These instruments must usually be worn several weeks or even months, and are liable to become the source of uterine infection. Dilatation twice a week by means of uterine sounds is about as efficient and is a less dangerous, although in the beginning a somewhat more painful, method.

As a last resort, the husband's semen has been introduced into the uterus by means of a syringe, but not often successfully.

FIG. 67.—OUTERBRIDGE'S SPECULUM UPON INTRODUCER

CHAPTER VI.

DISORDERS OF THE SEXUAL RELATION.

(*Anaphrodisia, Nymphomania, Perversion, Dispareunia.*)

1. A normal condition of the sexual system presupposes a certain amount of sexual excitability. This excitability may be either entirely absent, abnormally developed, or perverted:

2. **Anaphrodisia.** The normal excitability may never have been developed or it may be suppressed.

When it has *never been developed* its absence depends upon an imperfect development or deformity of the sexual organs, or upon a delayed, arrested, or perverted development of the nervous and vascular systems.

In the former case the local condition should be treated as recommended in part second. In the latter a change of habits from sedentary to active out-door occupations, or from excessive and exhaustive occupations to lighter ones. Massage, electricity, abundant feeding, amusements, and other means that may be indicated to restore the system to a healthy, active condition should be employed.

In some women no cause can be discovered, and no remedies seem to alter the condition.

3. *Suppression* of sexual excitability may be due to an exhaustion of the sexual nervous centers, from excessive indulgence, to impairment of nervous function from debility, and to disease of the sexual, nervous, or general system.

The treatment consists in the temporary avoidance of the sexual relations, and the employment of means to restore the health and vigor of the patient.

Among the causes may be specified debilitating diseases, hemorrhages, misfortunes, mental anxieties, neurasthenia, hysteria, melancholia, chronic pelvic inflammations, organic diseases of the nervous system, conjugal incompatibility, etc.

4. **Nymphomania**, or an abnormal development of sexual excitability, occasionally affects children and old people as well as menstruating women. It is usually the result of masturbation or frequent indulgence. The original or predisposing causes may be mental (erotomania), idiocy, inherited tendencies, local irritations, or diseases. Among auxiliary causes may be mentioned overeating, indolent habits, improper reading or conversation, and false notions as to supposed benefits of sexual indulgence.

5. The *treatment* consists in removing the cause and in breaking up the habit of indulgence. Constant watching and prevention of overindulgence are often necessary. The patient must be taught the harmfulness of the habit and convinced of the possibility of restraint. Constant occupation, Turkish baths, sponge baths, tepid sitz baths, change of associations, journeys to a cold climate, etc., are useful. Bromid of potassium in 15 grain (1 gm.) doses three or four times daily is a good remedy for temporary use.

Clitoridectomy and oophorectomy have been tried and have failed to effect a cure, and are only indicated when incurable disease of the external genitals or ovaries respectively perpetuate the condition. When the clitoris is amputated the nymphæ should also be removed.

6. **Perverted Sexual Excitability** and the indulgence in unnatural practices seems to act more disastrously on the health of women than on men, by increasing pelvic congestion and aggravating diseased conditions already present. All unnatural forms of coitus or sexual excitement must be prohibited.

7. **Dispareunia** is a symptom of various diseases. Organic disease, deformity, maldevelopment, cicatricial contraction or displacement of any of the genital organs, genital neuroses, such as hyperesthesia, vaginismus and hysteria, trauma, rectitis, anal fissure, hyperinvolution, premature senility, cicatrices, pelvic tumors, want of proportion between the male and female organs, roughness on the part of the husband, etc., may give rise to the complaint.

The *treatment* consists in removing the cause. Smallness of the vagina can often be relieved by packing the vagina two or three times weekly with borated cotton and leaving it for thirty-six hours each time, or in the use of the ordinary glycerin and wool tampons (part I, chap. IV, par. 9).

CHAPTER VII.

HYPERESTHESIA AND VAGINISMUS.

1. **Hyperesthesia** of the pelvic organs consists of an abnormal sensitiveness of the pelvic viscera, lower abdomen, and sometimes of the tissues about the coccyx.

Inflammation or cicatricial tissue about the hymen, inflammation or imperfect development of the ovaries or other sexual organs, or even no appreciable local lesion may be present. There is often hysteria, neurasthenia or

spinal irritation, or a condition of the nervous system bordering on these conditions.

The chief symptom is a complaint of pain upon an attempt at an introduction of the male organ or upon examination either of the vagina or lower abdomen. By proceeding very slowly, however, and diverting the patient's attention from the examination, quite firm pressure may be made within the vagina or upon the abdomen without pain, although great pain may have apparently been produced by the first contact. Coitus is in some cases tolerated, in others not at all.

2. The *treatment* consists first in removing the pathological conditions. A piece of cotton saturated with glycerin may be introduced through a small speculum and left for thirty-six hours. In two or three days a still larger one, and so on until the parts become accustomed to the presence of a foreign body. The speculum should gently stretch the vagina each time it is introduced.

Stimulating and antiseptic vaginal douches, such as a one or two per cent. solution of carbolic acid, 1–2000 of corrosive mercuric chlorid, or of potassium permanganate, should be used twice daily while the tampons are not in the vagina.

Ulcerations may be touched with strong carbolic acid or a ten per cent. solution of nitrate of silver once a week.

The manipulations should be gentle, and the patient must be convinced that she can tolerate them, since the condition is partly mental and imaginary.

3. **Vaginismus** consists of hyperesthesia of the vulvovaginal orifice and neighboring parts accompanied by painful contraction of the perineal muscles. Burning, itching, and bearing-down sensations are in some cases felt between the attacks of spasm.

The spasm is produced by attempts at coitus, digital examinations, douching, etc., and the mental condition is often such that the spasm occurs before the parts are touched. In extreme cases not only are the vaginal entrance, the anus, and urethra tightly closed, but the muscles of the thighs are contracted, and the conditions resemble an attack of convulsions. Under anesthesia the parts remain relaxed and an examination can easily be made.

The source of irritation is most frequently an inflamed, fissured, or ulcerated condition of the remains of the hymen, although the lesion may be about the vulva, anus, or urethra.

The general health is apt to be deleteriously affected. It more often affects newly married women, occasionally young girls.

4. The *treatment* in mild cases is the same as for hyperesthesia (par. 2). Tonics, laxatives, sitz baths, and hygienic regulations are useful. Coitus should not be attempted.

In pronounced cases, the vaginal entrance should be forcibly dilated under anesthesia by withdrawing a widely expanded bivalve speculum. Ulcerated spots or diseased carunculæ should be extirpated. If the perineum be unusually high, or the vaginal entrance very small, two lateral incisions through the edges of the constrictor cunni, levator ani, and transversus perinei muscles, converging in the median line just above the sphincter ani to form a V, should be made. The parts should be stretched both before and after the cutting. A hollow glass plug about two inches in diameter, resembling a widened test-tube, is worn two hours, morning and afternoon, for several weeks. (J. Marion Sims.)

CHAPTER VIII.

PRURITUS VULVÆ.

1. *Pruritus*, or itching of the vulva, is a symptom rather than a disease. It may be a symptom of local disease, such as follicular vulvitis, eczema or trichiasis. It may be due to the irritation of abnormal urine, as in diabetes, cystitis or indigestion, or of unhealthy vaginal discharges in cases of vaginitis, follicular cervicitis and malignant disease. It may also be a reflex sensation occasioned by disease of the rectum, urethra or uterus. Parasites, varicose veins, obesity and pregnancy may be causes. Constipation and sedentary habits aggravate it.

The itching or burning sensation is characterized by its intense and intermittent nature and may remain away for hours and days to return as bad as ever.

2. The *treatment* consists primarily in removing the cause. The bowels should be regulated, the urine rendered normal, and cleanliness secured by sitz baths and copious vaginal douches. Two per cent. solutions of carbolic acid, creolin or acetate of lead repeated three or four times daily are of palliative value.

Local applications to destroy germs, relieve irritation, benumb the nerves, and shield the vulva from contact with the irritating discharges are indicated.

One part carbolic acid in ten of the benzoated oxid of zinc ointment, one part of corrosive mercuric chlorid in 500 of emulsion of bitter almonds (Skene), one part of chloroform or hydrocyanic acid with ten of glycerin or olive oil, one part of chloral or menthol in ten or fifteen of vaselin, make good applications to protect the parts and relieve the itching. When the mucous membrane is thickened and other remedies fail, a ten per cent. aqueous solution of nitrate of silver

may be applied. In pregnancy and other conditions connected with vaginal discharges cotton dipped in a five per cent. solution of boroglycerid in glycerin, with or without a small percentage of menthol, may be placed in the vagina.

Frequent applications of cloths wet with cold water relieve many cases when the above remedies fail. A ten per cent. solution of cocain in water usually gives temporary ease.

CHAPTER IX.

HYSTERIA AND HYSTERO-EPILEPSY.

1. Hysteria is a functional disorder of the nervous system that occurs four times as often in women as in men, and is frequently associated with, and aggravated by, disease of the genital organs. It is associated with an excitable nervous system and a want of will power, and is manifested by uncontrollable nervous paroxysms or *crises*, and intermediate states of perverted nerve function.

2. The *predisposing* causes are a defective or unbalanced nervous organization due to hereditary and social influences.

The *exciting causes* are mental shock produced by sudden fear, intense or prolonged excitement, anxiety or grief; also the influence of example, as well as suggestion originating in the unmerited sympathy and meddlesome ministrations of friends or associates.

There is usually a family history of nervous disorders or of excesses of various kinds. The training of the child is apt to be neglected, irregular, overindulgent, or harsh in character, developing a willful or inordinately selfish disposition; and the hygienic surroundings are often such as prevent healthy development. When from any cause the nervous system has been subjected to a shock or prolonged strain, the solicitude of friends, or solitary brooding of the patient over the

event, combined with physical ill-feelings, prolong the mental depression and develop imaginary ailments and conditions.

3. The *symptoms* of hysteria vary from mere exhibitions of excitability, provoked by slight causes, to prolonged and frequent convulsive attacks. There is in some cases a hyperesthesia, mental or physical, that renders the patient more or less unfit for ordinary social intercourse. Paroxysms of uncontrollable laughter or crying, hilarity or depression, without apparent reason, explosions of anger or terror upon the slightest provocation, headache, sleeplessness, attacks of trembling, flushing, chilliness, choking sensations and, above all, unreasonable actions or complaints designed to impress the spectator with the importance or wonderful character of her ailment, are among the most common. A show of sympathy or attempt at correction on the part of friends is apt to bring about a crisis resembling a fainting fit or convulsion.

In the severer forms signs of serious functional disturbance may be present, such as anesthesia, hyperesthesia, incomplete paralysis of the special senses or of different portions of the body, or contractures of the muscles of the face or extremities. Dyspepsia, constipation, vomiting, swallowing and regurgitation of indigestible things, persistent fasting, polyuria, anuria, imitations of barking or other unusual sounds, and all sorts of vagaries resulting from a perverted imagination assist in making up a truly kaleidoscopic clinical exhibition.

The anesthesia may be a hemianesthesia, a segmental or a disseminated anesthesia. Limitation of the visual field, loss of color sense, and impairment of hearing and taste are frequently observed. Hyperesthesia occurs in places, most frequently the iliac, inframammary, inguinal, spinal, and epigastric regions. These places are called hysterogenic zones, and pressure upon them may precipitate or check a crisis. Paralysis may exist as a hemiplegia, a paraplegia, or as a

paralysis of a limb, of the larynx (aphonia), muscles of the eye, or occasionally of the face. Tremor may affect the head, tongue, or extremities.

In fact, almost any of the symptoms of disease of the nervous system may be simulated either by accident, design, or unconscious imitation.

4. *Hystero-epilepsy* is the name given to the cases with severe crises that resemble epileptic convulsions. After prodromic feelings of malaise or irritability, the patient experiences a sort of aura, utters a cry, falls to the ground, and becomes rigid, or contracts and relaxes the muscles as in a case in true epilepsy. After a time the motions cease, and are soon followed by violent flexion and extension of the body, and sometimes by other contortions. This lasts from one to three minutes, and is followed by the emotional stage, in which some emotion seems to be the cause of either the movements or of attitudes taken. In ten or fifteen minutes this gives way to a stage of delirium, and the patient gradually emerges from the attack.

But few cases are typical. Usually one or more of these states will be observed, and the attack will be milder than that described above, and may last longer and recur many times a day. The best developed attacks are observed in institutions where patients can see the attacks in others, and mimic them.

5. The *diagnosis* is based upon the stigmata, such as the anesthesias, hyperesthesias, paraplegias, aphonia, limitation of vision, etc., already described, and the character of the crises. The irregularity of the symptoms and of the course of the disease, the influence of the emotions of the patient, and the effect of example or suggestion upon her symptoms, serve to distinguish the condition from organic diseases. A local examination of the pelvic organs in young girls should not be undertaken except for decided pelvic symptoms, and then it should first be a rectal exam-

ination under anesthesia. The patient's attention should not be directed to the sexual organs.

In the milder forms the frequent use of the words "terrible" and "fearful" for the description of trivial symptoms, incessant talking about their ailments, attempts at the excitation of sympathy, etc., are indications of the hysterical condition.

The epileptiform attacks are produced by excitement, or by pressure upon the hysterogenic zones, and may be broken up by cold effusions or other disagreeable shocks. They are usually characterized by the presence of emotion, or of concealed emotion or design. The movements if considerable are coordinate, the tongue is never bitten, and the body not injured. The attacks may last a long time, and be frequently repeated without the exhaustion, the complete loss of consciousness, nor the subsequent rise of temperature that belong to epileptic seizures. The patient never defecates or urinates during the attack.

6. The *prognosis* is good if the case is treated early. Old cases treated under unfavorable surroundings are often hard to manage. Incurable pelvic disease affects the prognosis unfavorably.

7. The *treatment*, first of all, should be directed to a regulation of the surroundings of the patient. She should be removed from the society of those who either irritate or humor her, and be placed under the influence of those whose firm but gentle demeanor will draw her attention from her symptoms and minimize them without antagonizing her. A sojourn among strangers, with pleasant occupation or amusement, will often prevent her from giving away to her feelings, and thus may lead to a cure. Hygienic and tonic treatment (part 1, chap. v) are to be employed, according to the condition. Menstrual disorders are sometimes relieved by these means, and may not need local treatment. Menorrhagia and dysmenorrhea call for rest during the periods.

Cases connected with great debility, weakmindedness, and

unfavorable home influences may require the Weir Mitchell rest treatment (see next chapter, par. 6, small type).

Two teaspoonfuls of the elixir of the valerianate of ammonia, or four or five grains (.25 to .35 gm.) of asafetida, every four hours, often have a magic effect upon the excitable condition in mild cases. Camphor and lupulin at bedtime sometimes act well in producing sleep. Well-nourished cases may require saline laxatives daily, and 15 grains of a bromid (1 gm.) three or four times daily.

The paroxysm may be broken up by throwing cold water on the face or chest, by pressure upon one of the hysterogenic zones, by inhalations of the spirits of ammonia, or by an emetic. If she cannot be made to swallow, $\frac{1}{12}$ of a grain (0.0055 gm.) of apomorphia may be given hypodermically. (Dana.)

CHAPTER X.

NEURASTHENIA (Nervous Prostration.)

(The Rest Cure.)

1. The chief conditions noticeable in neurasthenia are weakness and irritability. There is imperfect nutrition of the nerve-cells with cerebro-spinal hyperemia or, exceptionally, anemia. There is also a weakness of the vasomotor nervous system, with consequent irregularities in the supply of blood to the skin and internal viscera.

2. Among the *causes* are a hereditary weakness of the nervous system, unhealthy modes of living, prevalent among rich families with social responsibilities, long-continued anxiety or mental strain with insufficient rest or sleep,

rapid child-bearing, sexual excesses, and pelvic disorders, with the invalid habits and notions engendered thereby.

The attack is often precipitated by an operation, an attack of sickness, attendance upon a sick friend, domestic infelicity, sudden fright, shock, etc.

3. The ordinary *symptoms* are weakness and a feeling of exhaustion after ordinary exertions, pressure on the top of the head, vertigo, wakefulness, irritability of temper, sensitiveness to noises, anxiety over symptoms and complaint of pain or distress in the iliac, intercostal, or epigastric region without adequate local cause.

The symptoms are made worse by the solicitude and pampering of friends. The patient is apt to take to the bed in a darkened room with all noises shut out. She may even assume certain attitudes, rejecting all pillows, or perhaps multiplying them indefinitely in order to rest all parts of her supersensitive and weary body. Food may distress her until her restricted diet no longer nourishes her well, and she becomes greatly emaciated. Thus not only her special senses, but all parts of her body are shielded and rested from an imaginary inability to stand the supposed strain of ordinary function. Hysteria, and occasionally spinal irritation, may aggravate the difficulty.

The weakness is real, the heart's action easily disturbed, the extremities cold, the sexual functions debilitated, digestion impaired and the bowels constipated, but their importance is exaggerated in her mind by a constant brooding and a tendency to despondency.

In many cases only a few of these symptoms are present.

4. The *diagnosis* must be made from hysteria, which is changeable in its symptoms, is not accompanied by such muscular debility or malnutrition, has (or has had) more distinct crises, has stigmata, and is relieved, instead of

being made worse, by disturbance. The neurasthenic is anxious to be relieved, and is temporarily improved by encouragement, while the hysterical patient is usually antagonistic.

Chronic organic diseases of the nervous system have a greater preponderance of the symptoms referable to the nervous centers over those of weakness and irritability.

Spinal irritation presents more pain and sensitiveness along the spine and spinal nerves, and greater prominence of motor and sensory symptoms in the parts supplied by spinal nerves, with fewer mental and cerebral symptoms.

5. The *prognosis* is favorable except in those cases dependent mainly upon hereditary characteristics. The recovery is usually slow if the symptoms are well marked and have continued for some time. Rapid recovery is apt to be followed by relapse if the patient returns to her own surroundings too quickly.

6. The *treatment* consists in removing her from her unfavorable surroundings, and placing her under influences calculated to rest the mind and develop physical vigor. Medicines should be used but sparingly and be dispensed with as soon as possible.

Mild cases, particularly those connected with symptoms of hysteria, may be treated as recommended for hysteria (chap. IX, par. 7).

Sponge baths, massage, mild galvanism, general faradization, abdominal massage for constipation (part I, chap. V, par. 7), with a restricted diet and a nap in the middle of the day, should be employed in the beginning. As the appetite improves the diet should be increased, but remain simple. She should take a walk and practice calisthenics twice daily, and take up horseback riding, bicycling, or other outdoor exercises. The mind should be interested

without undertaking any systematic work. She should be allowed no time to think of her symptoms, which, whenever complained of, should be explained away and never referred to.

Valerian or asafetida may be given for nervousness, or a bromid or sulphonal for sleeplessness and headache, but these remedies should be steadily diminished in quantity and discontinued after a few days. The patient must be taught the harmfulness of nervous sedatives and the necessity of fresh air, plain food, exercise, and regular habits.

Local treatment should be coupled with encouraging reports of progress and be discontinued as soon as possible.

Cases that resist treatment can usually be cured, or at least started on the road to recovery, by the Weir-Mitchell rest cure modified to suit the case. The following is an enumeration of the essential details as followed out by myself:—

Promise the patient a positive cure on condition that you are to have complete control, she to concern herself with nothing but following directions. All friends and relatives are to be kept away from her as long as you consider it necessary. Take the patient away from home, or isolate her in a quiet room, and place her in charge of a competent trained nurse, who is healthy, strong, cheerful, discreet and firm, but not authoritative in manner. Allow no visitors. Write down complete directions each day, in order that there may be no deviations, and that the nurse, who is supposed to have no authority to deviate, may play the rôle of companion and helpmate to the patient in carrying them out, rather than that of an authority. The firmness of the nurse consists merely in not allowing any deviation from orders; her manner must be cheerful and her society entertaining.

Put the patient to bed for two or three days. Give her no food but an ounce of milk with an ounce of lime-water every hour during the day, and double that quantity at bedtime, and once or twice during the night. Water *ad libitum*. Give double the above quantity of milk and lime-water on the second and third days. If patient is very hungry, she may have a little toast or cracker at meal times on the third or fourth day; after that meals as directed farther on. Fleshy

patients are kept on a liquid diet two or three days longer than those who are emaciated.

Each morning after a nourishing drink the patient's toilet is attended to by the nurse, and includes a general sponge bath with alcohol. After that breakfast, if she has got that far along, then a rest of half an hour or so and, if there be constipation, abdominal massage (part i, chap. v, par. 7) followed if necessary by an enema of plain water. Then some light reading or entertaining conversation by the nurse. During the forenoon general faradization—patient's feet on one electrode (more often the negative) and the hands grasping the other. Part of the time the nurse grasps one electrode in one hand, and with the other well moistened rubs gently over the different muscles of the body. The current should be scarcely felt by the patient the first time or two, and never uncomfortably strong. The seance is continued from one-fourth to three-fourths of an hour according to the patient's toleration, stopping short of producing weariness. Massage or gentle rubbing and light kneading of the muscles of the trunk and limbs are given before bedtime to the extent of gradually bringing on slight weariness and sleepiness. The first massage treatments should be mild and soothing, later more vigorous.

After three days the patient sits up half an hour morning and afternoon, and increases the time by half an hour on each occasion until she sits up two hours morning and afternoon. After that she is up all day, and walks about the room, but lies down two hours in the middle of each day. The electricity may be given when she lies down; but in some cases the electricity makes the patient sleepy, and if she does not sleep well it may change places with massage, and be used at bedtime.

The patient must now take Swedish movements, respiratory exercises, or work with half-pound wooden dumb-bells, or one pound Indian-clubs twice daily, and in a few days more must go out for a short walk twice daily with the nurse, but without at first meeting her friends. The exercises and walks should be of very short duration in the beginning, and should not tire the patient out, but should be increased *gradually* and *steadily*.

Before many days the time of the patient and nurse will be completely filled with work, and it will become a matter of good management to get it all in along with the midday rest. The patient's powers of endurance have increased wonderfully by the end of a month, and her progress has been regulated in such a systematic and grad-

ual manner that she has not been conscious of doing anything to bring on old pains. She and the nurse should have good times together, reading, walking, exercising, napping, and talking over their new experiences. The physician's visit should also bring with it new and pleasant thoughts. If she has felt pains, the nurse's and physician's cheerful assurance that they are but the lingering pains of habit, and that they will go away very soon never to return, together with the constant agreeable occupation for the body and mind, have made her forget them and believe herself cured of them. In the meantime, she gains flesh at the rate of three to five pounds a week, and has but to look in the mirror to be convinced of her improvement. She gains in comeliness as well as strength.

The diet after the third or fourth day may be rapidly increased, to keep pace with the accelerated tissue changes due to massage, electricity and added exercise. A glass of milk is taken with meals, between meals, at bedtime, and upon awakening in the morning. A little toast, cracker, or cooked cereal may be given at meal-time. Toward the end of the first week and after that, fresh broiled, baked or roasted beef, mutton, fish or fowl, or a soft egg, twice daily, with toast, cracker, bread and butter, fruit and jelly are allowed. The third meal should consist of milk, cereals, bread, and fruit. The nurse should either prepare or arrange the food so that it will come to the patient fresh, hot and daintily served. After the third week, potatoes and light vegetables may be given once daily. Pie, cake, pudding and the like should be prohibited. Milk should be given in large quantities throughout. The nurse should study the patient's likes and dislikes, but should arrange and vary the bill of fare each day without consulting her about details.

Even patients that cannot ordinarily drink milk can take it in the small diluted quantities recommended for the first days, and often can then continue it in larger quantities. If not, a thin gruel made with half milk, or a thin water gruel with the white of an egg added to each two ounces (60 gm.) or well-skimmed broth may be substituted. Milk is, however, very much to be preferred.

After three weeks, or after the patient is able to take good walks, and is no longer solicitous about her condition, she may occasionally see friends who, however, are cautioned not to speak of her previous illness.

The patient should then be taught to continue taking midday rests and increasing her exercise as before, and never to lie down for pain,

nor take medicine for nervousness or sleeplessness. It is better for her to keep the nurse for a week or two after she associates with her family, and for the physician to see her twice weekly for another month, in order to explain away symptoms and give directions about exercise, diet, habits, etc. She should not pass entirely from under his influence for many months.

PART FOUR.

TRAUMATIC LESIONS OF THE GENITAL TRACT.

CHAPTER I.

CONTUSIONS AND HEMATOMA OF THE VULVA.

1. **Contusions** of the vulva are of importance because of the liability to hemorrhage from the plexus of veins about the vestibule.

Falling upon sharp or hard objects, rough marital embraces in very young or old people, kicks, cuts, etc., are the ordinary causes.

They are to be treated by cold and soothing lotions and, if the skin is broken, by cleanliness and antiseptic applications, the same as contusions occurring elsewhere on the skin. Deep lacerations should be sutured to prevent hemorrhage and subcutaneous extravasation of blood.

2. **Hematoma** of the vulva may result from the rupture of a varicose vein during pregnancy, from the pressure of the head during labor, from contusion or from the puncture of a vein by a needle during an operation.

When it occurs during labor, it may distend the vulva and extend into the pelvis or even under the skin beyond the vulva. It may form rapidly or slowly. In the non-pregnant state the tumor formed is seldom larger than an egg, often smaller. The blood either coagulates or thickens, and becomes enclosed in a capsule.

3. Sometimes no *symptoms* accompany its formation. Usually, however, a burning pain is felt, followed by a sensation of fullness or tension in the parts, and perhaps by a desire to urinate and defecate. An elastic, globular tumor is discovered in the labium majus, which is not very tender, if at all, and which, after a few days, gradually diminishes in size and finally disappears. Small ecchymoses are in some cases seen in the venous radicles surrounding it.

When it occurs during childbirth, the amount of blood effused may impede labor, or even endanger life.

4. The *diagnosis* from hernia is made by the existence of pregnancy, the manner of the occurrence of hematoma, its seat, the surrounding ecchymoses or varices, the absence of succussion upon coughing, its irreducibility and (except in the beginning) its insensitiveness.

5. The *treatment* of large hematomas, seen within the first few hours, consists in evacuating the blood by a longitudinal incision on the inner side of the vulva, and sewing up its bed by deep sutures which include the ruptured vein. Small hematomas should not be disturbed. When a hematoma of several days' duration is incised, the capsule should be extirpated and the wound completely closed by sutures.

Incision and packing is not good surgery, since it converts the hematoma into an ulcer or abscess, and thus makes the condition worse. If suppuration has already taken place, it may still be possible to remove the capsule, disinfect with a 1–2000 solution of corrosive mercuric chlorid, and by deep sutures secure a primary union of the raw surfaces.

CHAPTER II.

LACERATION OF THE PERINEUM.

1. **Anatomy.** The female perineum occupies the space between the rami of the pubes and ischia and the tip of the coccyx, and is covered by the vulva and surrounding skin. The triangular ligament is, in the female, called the perineal septum. It consists of two layers of fascia enclosing a thin layer of muscular fibres that form, at its lower edge, the internal *transversus perinei*, and is perforated above for the passage of the vagina and urethra. Upon the outer surface of this, and inclosed in the *external perineal fascia*, are the *erector clitoridis*, the *constrictor cunni*, the external *transversus perinei*, and *sphincter ani* muscles. About an inch and a half (0.50 cm.) above the sphincter ani, the descending rectum turns backward over the edge of the levator ani muscles toward the anus, and thus passes under the lower edge of the perineal septum.

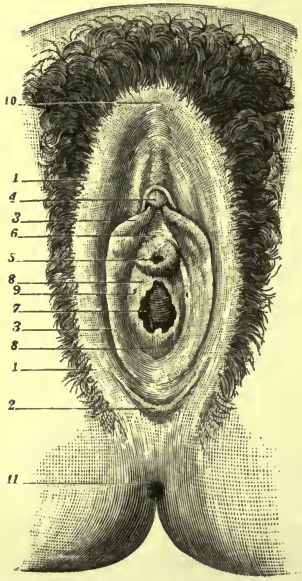

FIG. 68.—THE VULVA. (*Thorburn.*)
1, 1. Right labium majus. 2. The fourchette. 3, 3. Right labium minus or nympha. 4. Clitoris. 5. Urethral orifice. 6. Vestibule. 7. Orifice of vagina. 8, 8. Hymen. 9. Duct of Bartholin's gland (should be lower). 10. Mons veneris.

The mass of tissues between the rectum, vagina and skin is called the perineal body. The triangle formed by a median section of the perineal body is called the perineal

triangle. The vulvo-vaginal side of the triangle is about $\frac{4}{5}$ of an inch (2 cm.) long, the cutaneous side 1½ inch (4 cm.) and the rectal side $1\frac{4}{5}$ (5 cm.) long.

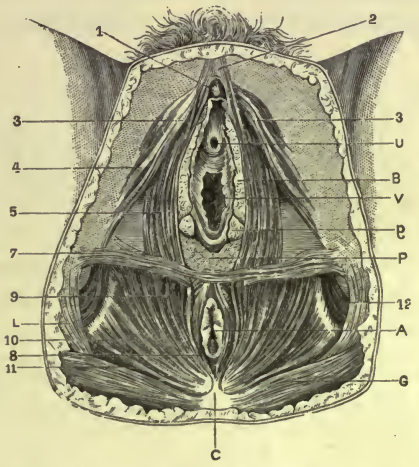

FIG. 69.—DISSECTION OF THE MUSCLES OF THE PERINEUM AND PELVIC FLOOR. (*Savage.*)
A. Anus. B. Bulb of the vagina. C. Coccyx. L. Larger sacro-sciatic ligament. P. Perineal body. U. Urethra. V. Vagina. G. Vulvo-vaginal gland. 1. Clitoris 2. Its suspensory ligament. 3. Crura clitoridis. 4 Erector clitoridis muscle. 5. Constrictor cunni. 7. Transversus perinei. 8. Sphincter ani ext. 9, 10. Levator ani. 11. Coccygeus. 12. Obturator ext.

2. On the posterior surface of the pubes near the subpubic ligament, on either side, arise two small bundles of muscular fibers, which pass downward around the lower end of the vagina, and meet under it at the recto-vaginal angle of the perineal triangle. They constitute the anterior edge of the levator ani, and are called the *levator-vaginæ* muscles.

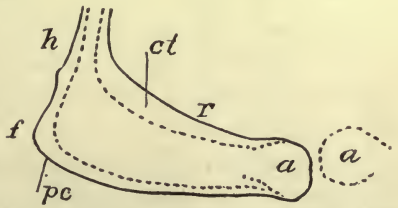

FIG. 70.—PERINEAL TRIANGLE OF VIRGIN, LIFE SIZE.
r. Rectal side. *ct*. Connective tissue. *h*. Hymen. *f*. Fourchette. *pc*. Posterior commissure. *aa*. Sphincter ani. The dotted lines indicate the fascial covering.

The *levator ani* forms a continuous ribbon of muscle, arising on the posterior surface of the pubic bone from the levator vagina to the white line (or dividing of the pelvic fascia into the obturator and recto-vesical on the obturator muscle), and along the white line to the ischial spine. The

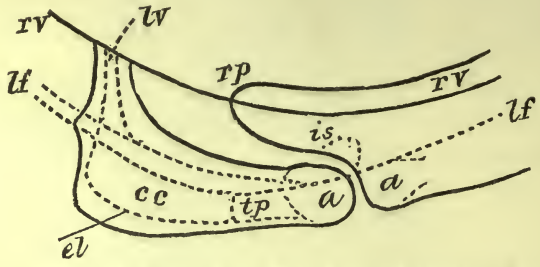

FIG. 71.—RELATIONS OF MUSCLES AND FASCIÆ TO THE PERINEAL TRIANGLE.

cc. Attachment of constrictor cunni or vulvar sphincter. *tp*. Attachment of external transversus perinei. *rp*. Rectal promontory, or pelvic floor edge. *lv* Attachment of levator vagina or vaginal sphincter *lf, lf*. Levator fascia and posterior layer of perineal septum. *el*. External perineal fascia. *rv*. Recto-vesical fascia. *aa*. Sphincter ani. *is*. Internal sphincter ani.

levatores ani extend down from either side to the rectal walls, and most of the fibers meet under the rectum at the coccygeo-anal ligament and at the lower end of the coccyx.

The *coccygeus* muscle forms the continuation posteriorly of the levator ani. It arises from the spine of the ischium and spreads out fan-shaped to be attached to the coccyx.

The internal or upper surface of these muscles is covered by the recto-vesical fascia, the external or under surface by the levator fascia.

3. **Function.** The function of the levator ani and coccygeus, with their attachments and fasciæ, is to form a muscular floor to the pelvis upon which the pelvic viscera will rest during abdominal pressure. The function of the perineum is to form an elastic barrier at the pelvic outlet which will permit of the passage of the excretions and pro-

ducts of conception, and at the same time firmly support the parts extending into and through it.

4. **Varieties of Laceration.** Laceration of the perineum is said to be complete when it involves the sphincter ani and anal mucous membrane, and incomplete when it does not.

Complete lacerations may barely involve the sphincter ani, or may extend one or two inches (three to five cm.) up the recto-vaginal septum. *Partial lacerations* may be entirely internal or vaginal, or entirely external in the perineal body. Vaginal lacerations may extend along the median line, but usually they are lateral and diagonal in direction, and may be either unilateral or bilateral. In the majority of cases they extend down through the vaginal entrance into the perineal body. Sometimes the tissues are torn transversely just behind the remains of the hymen, sometimes they are

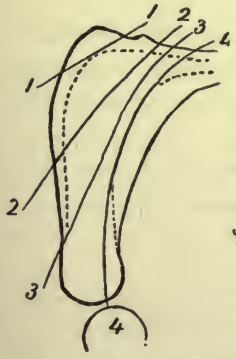

FIG. 72.—NORMAL SHAPE OF PERINEAL BODY IN MEDIAN SECTION. The lines 1, 2, 3, and 4 show the extent of various degrees of external lacerations.

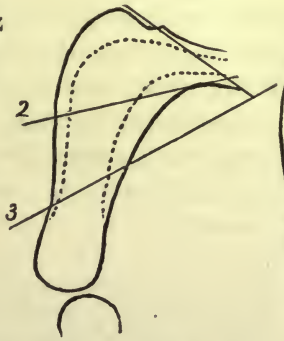

FIG. 73.—The lines 1, 2, and 3 indicate the depth of the lateral or diagonal lacerations as they extend outward into the perineal body to one side of the rectum.

FIG. 74.—Deformity produced by uncicatrized transverse laceration just within the vaginal entrance.

torn asunder in various directions. Occasionally minute scattered subvaginal lacerations leave a general vaginal and

vulvar relaxation and condition of subinvolution, without any visible laceration. Exceptionally the fetus passes through the perineal body leaving the fourchette intact (central laceration).

5. The transverse and the scattered subvaginal lacerations often make no perceptible attempt at union or cicatrization, and leave the vagina and vulva relaxed. Posterior colpocele, rectocele, anterior colpocele, cystocele, and even retroversion and prolapse may then result.

The other forms of laceration tend to heal, partly by primary union and partly by cicatrization, but some vulval deficiency and displacement usually remain.

6. **The Causes** are a too rapid expulsion of the head during labor, or a disproportion between the maternal and fetal parts, pressure of the blades of the forceps, unnatural rigidity or deformity of the maternal tissues, firmness of the cranial bones of the fetus, etc.

7. **The Symptoms** are those belonging to the displacements. In complete lacerations the intestinal gases and feces pass involuntarily, giving rise to more or less rectal, vaginal, urethral, and cutaneous irritation.

The immediate symptoms are hemorrhage and local sensitiveness to the touch, followed by some inflammatory reaction about the wound.

In complete lacerations that involve only the edge of the anal mucous membrane, the cicatrization is sometimes sufficient to prevent the escape of the feces, except under pressure.

8. **Diagnosis.** Recent lacerations are known by the pain produced upon touching the parts. On account of the general discoloration and relaxation of the tissues immediately after labor, a careful inspection of both the perineum and vaginal entrance with the patient in the dorsal

position, and before a good light, is necessary. By separating the labia and sponging off the blood, the difference between the shiny vaginal membrane and oozing raw tissue becomes apparent. The anterior vaginal wall should be held up against the pubes by a vaginal retractor and the lacerations traced up into the vagina. They may extend as far as two inches beyond the entrance. The finger should be introduced into the rectum and the thumb into the vagina, and the thickness, or perhaps the absence, of the sphincter ani and recto-vaginal tissues demonstrated.

Old lacerations are diagnosed by palpation and inspection. The finger detects the deficiency at the posterior commissure, or the relaxation of the vaginal entrance, or both. The finger can readily palpate the pubic rami down to, or almost to, the sphincter ani in the partial forms. In the complete form the finger passes down along the pubic rami into the anus or rectum.

Upon inspection the deficiency and displacement are apparent. When the rectum is affected the darker red rectal mucous membrane is visible at the bottom of the vulvar deficiency, which is progressively wider below, *i. e.*, posteriorly. The finger introduced into the rectum finds the torn edge of the recto-vaginal septum either at the sphincter or higher up on the anterior rectal wall.

When the sphincter is not involved, the finger in the rectum can be hooked forward so as to put the perineal tissues on the stretch and reveal the cicatrices even to their small ramifications. If at the same time the thumb is placed in the vagina the thickness of the remains of the perineum can be estimated.

9. **Treatment.** Lacerations of the perineum should be repaired within a few hours after labor, preferably immediately after, because the parts are then more or less be-

numbed, and a general anesthetic can often be dispensed with. A few applications of a five or ten per cent. solution of cocain anesthetize the parts sufficiently in lacerations of moderate extent.

The patient is placed on a table in the dorsal position and the anterior vaginal wall held out of the way by a retractor. The blood is sponged away, the vagina loosely packed with strips of aseptic gauze, and the vaginal entrance washed with a 1–2000 corrosive mercuric chlorid solution. The ragged edges are then trimmed off with scissors. A short, half-curved needle, or needle with a handle, armed with silkworm-gut, is introduced near the upper edge of the vaginal wound so as to take a deep lateral hold upon the connective tissue and emerge at the bottom. It is then reintroduced beside the point of exit and brought out again opposite the first point of entrance. Other sutures are introduced a centimeter (one-third of an inch) apart, until the external parts are reached. The wound is then disinfected again and the sutures tied in the order of their introduction. The external wound is then closed by sutures introduced from side to side under the edges of the skin.

When the sphincter is torn, but the rectal wall remains intact, the first two external sutures should be introduced under the edge of the skin, one at the inner and one at the outer border of the end of the torn sphincter, and should extend inward a little beyond the anal tear, in order to draw the torn edges of the rectum down against the sphincter and completely close the rectal tear. When the rectal mucous membrane is extensively torn it may be first sewed by catgut or fine silk, or may be left without sutures, provided the vaginal sutures can be made to include the entire thickness of tissue down to the rectal edges. In that case

the first, or farthest, suture should, instead of going straight down into the wound, take a direction diagonally toward and beyond the top of the tear, in order to get a large hold upon the tissues, and to draw the upper portion of the rectal tear downward and bring it more under the protection of the deep external sutures. The lower external ones should enter deeply into the tissues in order to add support to the rectal sutures.

If the operation has been delayed for several days the original wounded surface may be freshened by a sharp curette or scissors or knife, thoroughly disinfected, and the parts be brought together in the same way. It is necessary to denude the surfaces until blood oozes freely from them in order to insure union.

The after-treatment consists in plain vaginal douches following each passage of urine. After the first two days one per cent. carbolic acid, or 1–4000 corrosive mercuric chlorid, douches twice a day help to prevent infection. Daily liquid stools should be maintained by laxatives after the second day, more particularly if the sphincter ani have been torn. The sutures may be removed in ten days in incomplete tears, but in the complete variety the lower two or three sutures should be left for at least three weeks.

The instruments needed are an anterior vaginal retractor, a pair of scissors, sponge holders, large and small needles and needle-holder, or a needle on a handle, hemostatic forceps, and two tenacula. The tenacula are useful in drawing torn edges together to ascertain the true relationship of the parts. A solution of 1–2000 corrosive mercuric chlorid should be kept convenient for the disinfection of the hands. Silkworm-gut, sponges, and sterilized gauze are required.

10. In cases of partial tears, in which the scars extend diagonally up the posterior vaginal sulci, or in which there is posterior colpocele or rectocele due to uncicatrized lacer-

ations, lateral or bilateral denudations extending up the vaginal sulci should be made, and should extend externally over as much of the perineum as necessary, when closed by sutures, to restore the parts to an approximately normal size and shape.

Emmet's technic modified is probably the best to follow in this kind of operation. A tenaculum should be introduced into the posterior vaginal wall in the median line at the crest of the rectocele, or just beyond the cicatricial tissue, and another just external to the remains of the hymen about a centimeter, or one-third to one-half inch below the level of the external meatus on either side, and the three points be brought together. If properly placed the tenacula should meet below the meatus urinarius with but little resistance from the tissues. A fourth tenaculum catches up the tissues in the median line near the

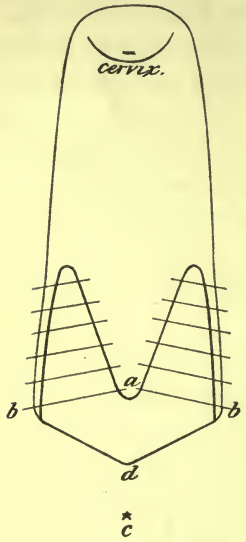

FIG. 75.—DENUDATION FOR BILATERAL PERINEORRHAPHY, WITH SUTURES PASSED. (*Modified from Emmet.*)

a. Crest of rectocele or point on posterior vaginal wall beyond the cicatrices, into which a tenaculum is thrust. *b*, *b*. Points on lateral vaginal wall, into which tenacula are thrust. *c*, Anus. *d* Lower edge of perineal denudation in the median line The approximation of *a*, *b*, *b*, forms folds of vaginal membrane that are to be denuded. A tenaculum catches the tissues at *d*, and determines the external edges of the denudation *b*, *d*, *b*.

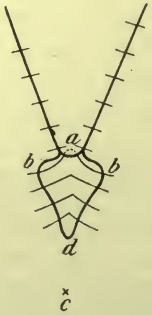

FIG. 76.—SAME, WITH VAGINAL SUTURES TIED.

lower end of the fold that extends down toward the anus when the lateral tenacula are approximated. Then the four tenacula are separated and held by assistants, while the operator with a knife makes a straight superficial incision connecting the lateral tenacula with the external one, and thus defines the external limits of the denudation. A similar line is drawn from the median vaginal tenaculum, and another from one of the lateral tenacula, to meet each other from one to two inches, or three to five centimeters, beyond the vaginal entrance on the lateral vaginal wall. The same is done on the other side. The outlined figure (Fig. 75) is then denuded by snipping the tissues with scissors curved on the flat, or Emmet's angular scissors, under the right lateral (patient's left) tenaculum points and continuing the snipping along the line extending into the vagina so as to remove a strip as far as the upper angle. Another strip is similarly removed beside the first strip, and so on until one of the vaginal triangles is denuded. Then a transverse suture of fine silkworm-gut is introduced at the upper angle, passing entirely under the denuded surface, and tied, and then another is introduced half a centimeter, or one-fifth of an inch, lower down and tied, and so on until the raw surface is obliterated. Then the other triangle is denuded and similarly stitched. Finally the perineal area is denuded and closed by coarse sutures passed across from side to side introduced through the skin near the edge. The upper external suture, which is placed first and tied last, should catch the tissues at the point of vaginal wall where a tenaculum was first introduced, and thus connect the three rows of sutures. A stream of 1–2000 corrosive mercuric chlorid solution should run over the parts as each suture is tied. After the patient is put to bed dry sterilized gauze is placed between the nates to absorb all moisture.

Each time the patient urinates the vagina is douched, the perineal sutures are irrigated with sterilized water, and fresh gauze is applied. After the second day a one per cent. carbolic acid douche is preferable. The bowels should be moved daily after the second day. The sutures are removed in eight days.

The instruments required are a small scalpel, a pair of long-handled scissors curved on the flat, or Emmet's angular scissors, four tenacula, a needle-holder, needles slightly curved on the end which are two cm., or two-thirds of an inch, long, sponge-holders, an anterior vaginal retractor, hemostatic forceps, and a leg-holder. An assistant must be at each knee, and two assistants or nurses to take care of sutures, instruments, change the water, etc. Fine and coarse silk-worm-gut sutures, plenty of boiled water for the sponges, 1–2000 solution of corrosive chlorid for irrigation and for the hands, sterilized gauze, sponges, etc., should be provided.

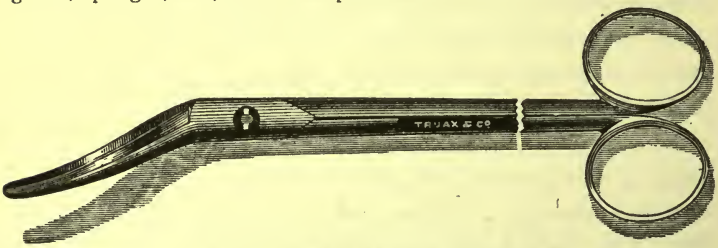

Fig. 77.—Emmet's Angular Scissors.

11. When a partial laceration is median or entirely external, as shown by the scar tissue, with only moderate relaxation of the vaginal entrance, Tait's flap operation, the most easily and quickly performed of all perineal operations, is indicated.

Two fingers of the left hand are introduced into the rectum to serve as a guide, while the lower sharp point of a pair of scissors is thrust deeply into the base of the patient's left labium (operator's right side) a little above the level of the anus and a transverse cut made across to the other labium.

Then both labia are split upward nearly as high as the meatus urinarius, so as to make a U-shaped incision, extending down one labium across the perineal body and up the other

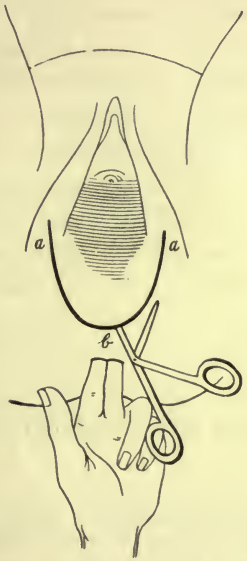

FIG. 78.—LINE OF CLEAVAGE IN TAIT'S PERINEORRHAPHY, denoted by the heavy line *a*, *b*, *a*. (See par. 11.)

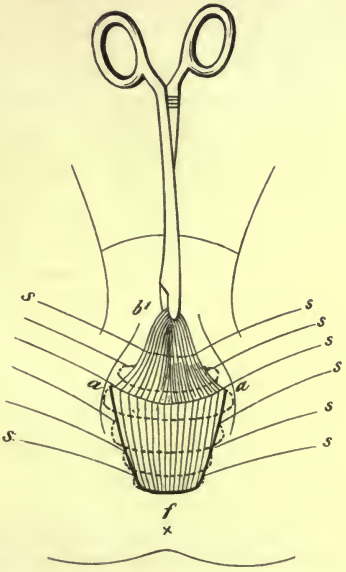

FIG. 79.—FLAP RAISED. *b'*. Point of flap raised from *f*. *s*. Sutures passed *b'*, *a*, *f*, *a*. Denuded space The dotted lines indicate the course of the sutures underneath the surface, including a liberal hold on the lateral tissues without including the skin in their grasp.

labium. The flap thus produced is grasped by forceps and drawn up in front of the urethra, and if it be found that the parts have not been deeply cleft, they should be cut deeper, that a broad raw surface of opposing labia on either side may be exposed. The flap should be long enough in the middle to reach above the mouth of the urethra.

With a full-curved surgical needle, or a needle with a

handle, a silkworm-gut suture should be entered under the edge of the skin at the upper end of the right labial cleft (patient's left), and made to grasp deeply the labial and perineal connective tissue laterally, and emerge in the median line a little above the base of the flap, grasping its lower portion. It should again enter the tissues beside this point, and emerge under the edge of the skin at the upper end of cleft of the opposite labium. A similar suture should be introduced a little less than a centimeter, or a quarter of an inch, below the first, and others below this. Two or three superficial sutures should be introduced through the flap, but they should not include much of its substance for fear of cutting off its circulation. The lower suture should be tied first and the upper one last, while a stream of a 1–2000 solution of corrosive chlorid runs over the parts. Two or three superficial sutures may be required to approximate the cutaneous edges.

The after-treatment is the same as that described in the preceding paragraph.

The wider and deeper the transverse cleft or bottom of the U, the more effect do the sutures have upon torn fibers of the levator ani.

The instruments needed are a pair of sharp-pointed angular scissors, hemostatic forceps, large full-curved surgical needles, or a needle on a handle, coarse silkworm-gut sutures, and the usual sponges, gauze, antiseptic solutions, etc.

12. Tait's method gives the best results in complete lacerations.

The same labial clefts are made from a level with the torn edge of the vesico-vaginal septum upward, and also across the edge of the septum so as to separate the vaginal and rectal membranes about one centimeter, or one-third of an inch. In order to expose the ends of the sphincter, a cleft is made on either side from the junction of the descending

and transverse clefts diagonally backward and outward for a little more than a centimeter, or about half an inch, and

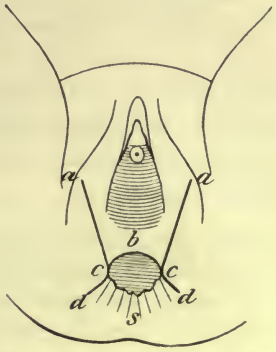

FIG. 80.—LINES OF CLEAVAGE OF TAIT'S PERINEORRHAPHY FOR COMPLETE LACERATION.

a c, *a c*. Lines of labial clefts. *c*, *b*, *c*. Edge of recto-vaginal septum which is to be split. *c d*, *c d*. Anal clefts to liberate the lacerated ends of the sphincter ani, *s*.

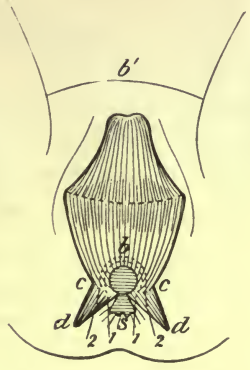

FIG. 81.—FLAP DRAWN UP.

Lines 1 and 2, including the dotted curved lines, indicate direction of the two lower sutures which approximate the raw edges between *c d*, *c d*, and close the rectal deficiency, *c*, *b*, *c*. The lines or edges passing from *d*, to meet each other at the reconstructed anus just over sphincter *s* (and which were separated from the edges *c d*, *c d*,), are drawn by the sutures, so that *d* comes in contact with *d*, thus uniting the two edges and the exposed ends of the sphincter *s*. [The ends of the lines at 2, 2 should be nearer the angles at *d*, *d*.)

as deep as the estimated thickness of the sphincter. These clefts are about parallel with the retracted ends of the sphincter, and expose the torn edges of the fibers.

The flap is held up as in the operation for incomplete laceration, and the edges of the anal mucous membrane are grasped by forceps and drawn together, reforming the circle of the anus (*s*, Fig. 81). The first stitch is introduced at the edge of the skin near the anal mucous membrane, takes a deep hold of the sphincter, passes around just beyond the split edges of the recto-vaginal septum, and back through the opposite end of the sphincter. The next suture passes under the edge of the skin at the bottom of the lower cleft, up (near *d*) across the recto-vaginal septum, just above

the other suture, and back on the other side. These sutures approximate the sphincter and close the rectum, and should have a *deep* hold upon the tissues. The remaining threads are entered as for an incomplete laceration (Fig, 79). They are all introduced and then tied, beginning with the lowest one.

After complete perineorrhaphy in addition to the attention recommended for incomplete tears, a daily *liquid* movement of the bowels should be secured after the second day, and the lower sutures be left for four weeks.

The instruments are the same as for the incomplete lacerations, The success depends to a certain extent upon the preparation of the alimentary canal, which should be as thoroughly evacuated the day before the operation as for abdominal section (part I, chap. II, par. 8).

13. When the laceration extends too far up the rectum to be entirely drawn within the grasp of the lower suture, vaginal stitches must be taken. The recto-vaginal septum

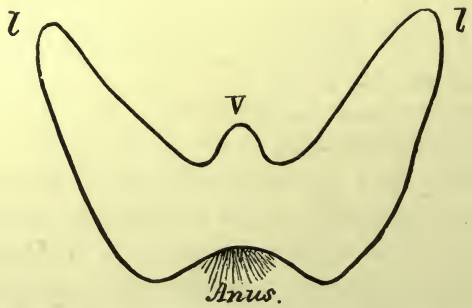

FIG. 82.—HEGAR'S DENUDATION FOR COMPLETE LACERATION.
v. Vaginal triangle. *l.* Upper end of labial denudation.

is deeply split all around, so that as the split tissues are separated the larger mass of tissues will be on the vaginal side. Then a suture is introduced at the vaginal raw

edge near the farther end of the tear, and made to take a diagonal direction so as to reach beyond the end of the tear, and is returned on the other side in a corresponding diagonal direction, without piercing the rectal mucous membrane, to a point on the vaginal edge opposite that of its first introduction. The diagonal direction gives the suture a much larger grasp of tissue, increases its efficiency, and shortens the tear. The remainder of the rectal portion is sewed with sutures passed in the same diagonal

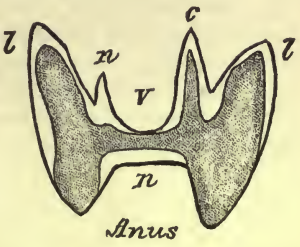

FIG. 83.—FREUND'S BILATERAL DENUDATION.

l, *l*. Labia. *v*. Posterior vaginal wall. *c*. Vaginal denudation around rectal tear.

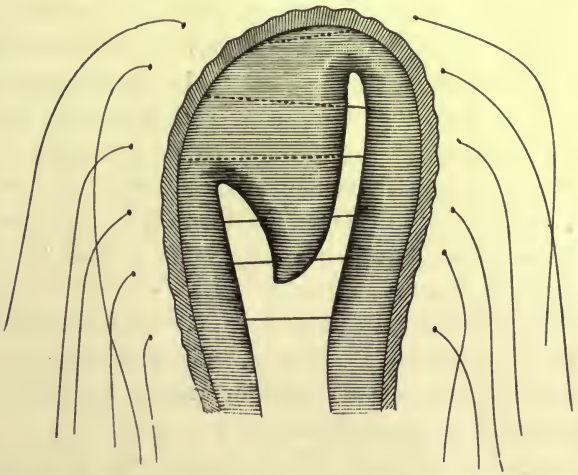

FIG. 84.—EMMET'S BROAD VAGINAL DENUDATION COVERING BOTH ENDS OF BILATERAL RECTAL TEAR. SUTURES PASSED. (*Emmet.*)

direction. Two or three usually suffice. The external parts are closed as recommended in the preceding paragraph.

Complete laceration may also be repaired by denuding the opposed labial and vaginal surfaces and bringing them together in the median line. Hegar (Fig. 82) makes a triangular vaginal denudation covering or surrounding the rectal tear, while A. Freund (Fig. 83) makes two lateral vaginal denudations passing up either side of the vaginal tongue (*v*) left by the bilateral diagonal laceration. Emmet (Fig. 84) makes one broad vaginal denudation so as to get a large approximation of connective tissue over the rectum, covering both ends of the rectal tear if it is bilateral.

CHAPTER III.

URINARY FISTULA.

1. By urinary fistula we mean a communication of the vagina or uterus with the bladder, urethra, or ureters.

The most common form is the *vesico-vaginal* fistula, situated in the vesico-vaginal septum. The other forms are the *vesico-uterine*, between the bladder and uterus, the *urethro-vaginal*, between the urethra and vagina; the *utero-vesico-vaginal*, in which the opening involves both the vagina and cervix uteri as well as the bladder, and the *uretero-vesico-vaginal*, in which a vesico-vaginal fistula involves the lower end of the ureter.

2. The extent of the fistula or defect varies from an opening that is invisible to a deficiency of a large part or all of the vesico-vaginal septum, anterior wall of the cervix and posterior wall of the urethra.

Cicatricial contraction with distortion and displacement of the uterus and vaginal walls, and more or less rigidity of the parts, exists in connection with large fistulæ.

3. **Causes.** Nearly all such fistulæ are the result of necrosis of tissue following prolonged pressure of the child's

head during labor, although the fistula may not become established for several days, or even two or three weeks afterward. A few are caused by instruments used in obstetric operations, by stone in the bladder, falling on sharp objects, pessaries and cellular abscesses. Those due to malignant disease do not concern us here.

4. **Symptoms and Diagnosis.** The symptoms are a constant or irregular involuntary discharge of the urine, excoriations and concretions of urinary salts, and the symptoms of the accompanying vaginitis and vulvitis.

Large fistulæ are readily discovered by the vaginal touch on account of the deficiency in the urethral, anterior vaginal or cervical walls, and the cicatricial contraction and retraction of the vaginal walls. The examining finger enters the bladder. Small fistulæ may be seen by placing the patient in the left lateral or knee-chest position, and drawing the perineum well back. Sometimes it is necessary to inject water colored by milk, picric acid, indigo, etc., into the bladder and watch for its place of exit.

5. **Prognosis.** Small and medium-sized fistulæ are as a rule curable by operation. Large ones are frequently incurable on account of the impossibility of bringing together the edges, or of covering the defect. Fistulæ not connected with the loss of tissue often heal spontaneously.

6. **Treatment.** The treatment consists in paring the edges of the fistula to the extent of removing if possible the overlying cicatricial tissue, and in uniting them with deep sutures that do not include the mucous membrane of the bladder.

The vagina should be douched with a normal (0.6 per cent.) saline solution four or five times daily for some days beforehand, and all concretions be removed by the finger from the vagina or vulva whenever found.

The steps of the operation are as follows: Sims' position. Catch up the edges of the fistula with a tenaculum, and pare the edges all around with scissors to the extent of producing a raw edge one-third of an inch, or a centimeter, wide, and beveled from the vesical mucous membrane outward. Beginning at the most remote portion, introduce silkworm-gut sutures half an inch, a little more than a centimeter, from the raw edge, and bring them out in the raw

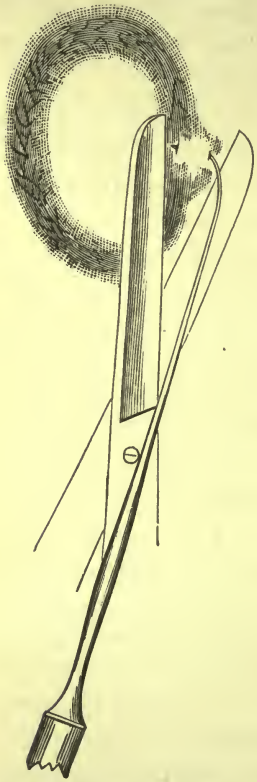

FIG. 85.—METHOD OF PARING THE EDGES.

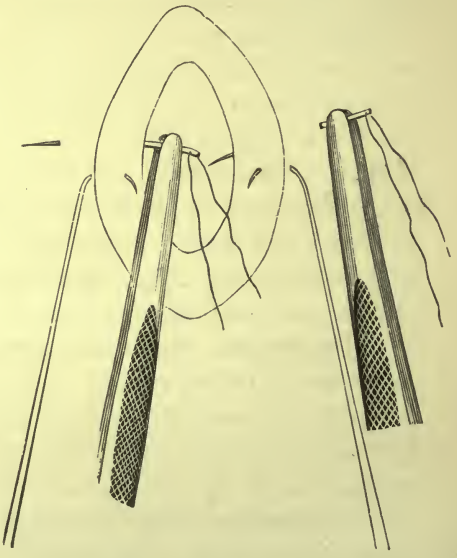

FIG. 86.—METHOD OF PASSING THE NEEDLE.

surface just under (not including) the edge of the vesical mucous membrane. Introduce them again into the raw surface opposite, just under the vesical mucous membrane, and bring them out in the vagina a little more than a centimeter from the raw edge. Douche the bladder.

The edges must be carefully approximated as the sutures are tied and, if necessary, a few superficial ones used.

It is possible to split the septum all around instead of paring it (Tait), and by introducing the sutures deeply to accomplish the same result.

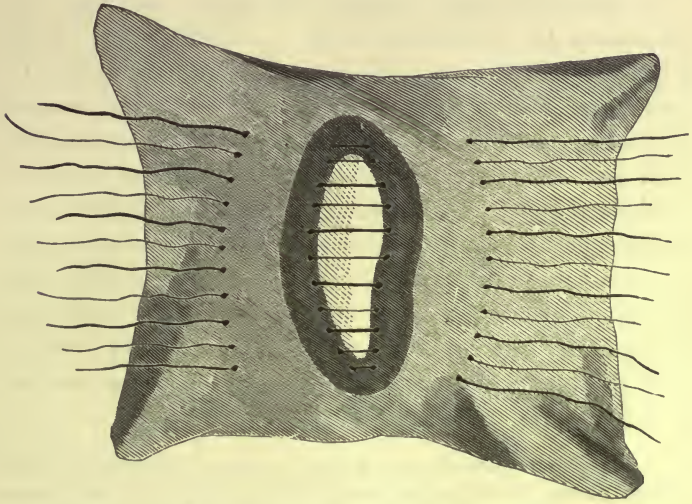

FIG. 87.—THE FISTULA WITH EDGES PARED AND THE SUTURES PASSED.

The instruments required are a Sims' speculum, tenacula, Emmet's angular scissors, sponge-holders, needle-holder, short needles with round point and slightly curved on the end, uterine sound, vulsella, a self-retaining catheter, and silk-worm-gut sutures.

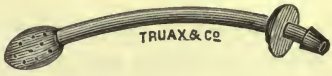

FIG. 88.—GOODMAN-SKENE'S SELF-RETAINING CATHETER.

7. The *after-treatment* consists mainly in preventing a large accumulation of urine by drawing it every three or four hours, or in wearing a self-retaining catheter, for the first week. The catheter must be carefully watched, and removed and cleansed every twelve hours and whenever it becomes occluded.

The bowels should be moved at least every other day,

and one per cent. carbolized vaginal douches be given twice daily. The patient should remain in bed for ten days. The stitches are left in place for two weeks.

8. When the fistula involves the cervix, the latter can sometimes be denuded in such a way that the vaginal edges are united to it. When the fistula opens within the cervix (vesico-uterine), the anterior wall of the cervix must be split up to it, the fistulous edges pared and closed, and then the cervical wound united as in ordinary cases of trachelorrhaphy. When the anterior cervical wall is destroyed, it is sometimes necessary to unite the vaginal edges of the fistula to the posterior wall of the cervix, thus turning the uterine discharges into the bladder. When the fistula is too high up in the uterus to be reached by the cervical incision, the external os may be occluded by vivifying it and sewing it up.

For large defects in the vesico-vaginal septum Bozeman practiced systematic traction upon the cervix until it could be brought down near the vaginal entrance, and sutured it behind the pubes to the anterior edges of the fistula. Peritoneal adhesions that resist this procedure should first be separated either by recto-abdominal manipulation, or by abdominal or vaginal section.

9. When it is impossible to cure the fistula in any way, the vagina may be closed by kolpokleisis (Simon). This is done by paring a strip of the vagina all the way around a short distance below the fistula, and uniting the posterior to the anterior vaginal wall by silkworm-gut sutures. A self-retaining catheter should be worn for a week or ten days afterward.

CHAPTER IV.

FECAL FISTULA.

1. By fecal fistula we mean a communication between the rectum and vagina, the small intestine and vagina, or the rectum and vulva or perineum externally.

2. The **causes** include those of urinary fistula. More often, however, direct injury by obstetric instruments, abscess in the connective tissue, and stricture and ulceration of the rectum are at fault.

3. The **symptoms** may at first be connected with those of the cause, but later the passage of flatus and feces per vaginam are the chief ones. In some cases perineal induration and purulent discharges complicate the condition, as in anal fistula.

4. The **diagnosis** is made by the discovery of the fistula, either by palpation and inspection in the dorsal position, aided by an anterior vaginal retractor, or the injection of a colored fluid into the rectum and watching for its place of exit.

5. The **treatment** consists in paring the edges and uniting them as in cases of vesico-vaginal fistula.

In all cases the sphincter ani should be widely dilated. If the fistula is near the sphincter or in the perineal body, the recto-vaginal septum should be split in the medium line out through the perineum and sphincter, and after all cicatricial and unhealthy tissue is excised should be sutured as for perineorrhaphy.

The preparatory and after-treatment are the same as for perineorrhaphy for complete laceration.

Entero-vaginal fistulæ usually heal spontaneously unless some obstacle to their union exists. The treatment consists in the treatment of the morbid conditions attending it.

CHAPTER V.

LACERATION OF THE CERVIX.

1. **Definition.** By laceration of the cervix we mean one or more tears into or through its walls. When the tear does not involve the external os, but goes entirely through the walls of the cervix above the vaginal junction, it is classed as a rupture of the uterus.

2. **Varieties.** Laceration of the cervix may be single or multiple, and may occupy any or all portions of its circumference. The most common varieties are the lateral, called unilateral if single and bilateral if on both sides, and the stellate, which consists of several tears radiating from the cervical cavity out in different directions. Internal lacerations are longitudinal lacerations or fissures within the cervical cavity that enlarge the cervical cavity without involving tissues beyond the external os.

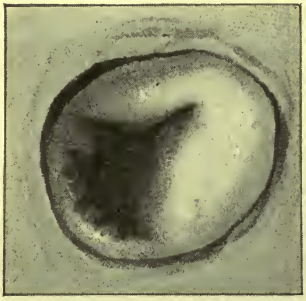

FIG. 89.—UNILATERAL LACERATION OF THE CERVIX. (*After Mundé and Thomas.*)

An infinite variety of lacerations are met with. They may be anterior or posterior, or they may take an oblique or curved direction; they may extend into the vaginal fornices, or they may be transverse,

(forming flaps), or annular, removing the entire rim of the cervix. Sometimes large vaginal rents extend from the cervical tears and open up the pelvic connective tissue or extend into the bladder. The vaginal lacerations heal by cicatrization, leaving palpable scars.

3. **Etiology.** The great majority of cervical lacerations take place during labor. A large head, a small or diseased cervix, premature rupture of the membranes, quick labor, malposition of the fetus, artificial dilatation of the cervix either in labor or in abortion, pulling upon the rim of the partly-dilated os with the finger, pressure of the cervix between the head and pubes, etc., are the ordinary factors.

Operations for dilatation or incision of the cervix may also give rise to it.

FIG. 90.—BILATERAL LACERATION OF THE CERVIX, WITH EVERSION OF THE CERVICAL MUCOUS MEMBRANE. (*After Mundé and Thomas.*)

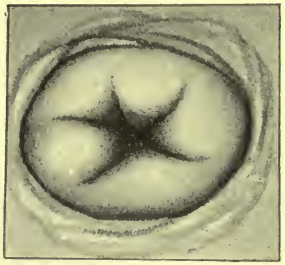

FIG. 91.—MULTIPLE STELLATE LACERATION OF CERVIX. (*After Mundé and Thomas.*)

Laceration occurs in nearly all first labors, but the majority are slight and apt to heal by adhesion of the surfaces, or they may contract so as to be of but slight importance. About one-third of all parous women have, or have had, an old laceration.

4. **Pathology.** When the laceration is of considerable extent the lochia, which bathe the edges, usually prevent complete union, and in septic cases entirely prevent it. Ulcerated surfaces remain upon which cicatricial tissue forms that fills the angles and in contracting interferes with the

normal circulation of the cervix. Small branching lacerations may produce cicatricial bands extending into the flaps and constricting the orifices of the glands. The ulcerated surfaces become infected sooner or later, and in turn infect the mucous follicles. These changes result in erosion, eversion, and often in follicular degeneration of the cervix. Many cases, however, recover without distortion, and the cervix may become normal except for the fissure corresponding to the laceration. (See part 6, chap. VII, par. 1, 2, 3, and 4.)

Endometritis, subinvolution, retroversion of the uterus, as well as displacement of the cervix by the contraction of vaginal scars, are frequent complications.

The most characteristic result is cellulitis, due to infection of the connective tissue. This may consist of a hard, temporary exudate extending from the tear to the pelvic walls, or of an exudate that rapidly breaks down and forms an abscess.

5. The **Symptoms** are those of the pathological conditions mentioned above. Backache, a bearing-down sensation in the pelvis, leucorrhea, metrorrhagia, derangements of digestion and nervous symptoms are the most usual ones.

6. The **Diagnosis** of laceration is made by both the digital and speculum examination. The finger recognizes the fissure or fissures that extend through the rim of the os into the substance of the cervix. When there is eversion, the cervix seems, at the first touch, enlarged with but slight lateral lacerations, but upon feeling around the cervix the finger glides over the edges of the everted lips to the natural-sized cervix above. From one side, or both, vaginal cicatrices can sometimes be felt extending laterally or anteriorly along the lateral vaginal wall. Internal lacerations give the cervix a relaxed, flabby character.

Upon examination with the bivalve speculum, the pathological changes in the cervix are apparent, but the extent of the laceration is not seen, because the lips, if not already everted, are drawn apart by the speculum, and the angles are partly concealed in lateral vaginal folds. However, by closing the speculum upon the cervix, the labia are brought together, turning in what seemed to be the end of the cervix, until the surfaces first seen disappear from sight. When examined in the left lateral position, through Sims' speculum, the lips may be everted and inverted at pleasure by catching each with a tenaculum, and thus the extent of the laceration be determined.

FIG. 92. — BILATERAL LACERATION OF THE CERVIX WITH EVERSION. SIDE VIEW.

Immediately after labor the cervical walls are thin, flabby, and relaxed, and the recognition of lacerations is difficult. Dr. John Bartlett* discovered that he could always recognize them by introducing two fingers into the vagina, with one finger within the enlarged rim of the cervix, and the other against the outer or vaginal side of the cervix. He thus grasps the cervical walls between the fingers, and carries them around the entire circumference, and is able to detect each deficiency as it is passed.

7. **Prognosis.** Many lacerations produce no bad results. When erosion and eversion have continued a long time, recovery cannot be expected, except by gradual inflammatory obliteration of the follicles or by senile atrophy. Treatment will often cure the disease, but it is liable to recur. Fortunately, a perfect cure can usually be attained by a plastic operation. When there is considerable glandular enlargement with erosion and extreme vascularity, there is danger of malignant degeneration.

* "Transactions Chicago Gynecological Society."

8. **Treatment.** The immediate repair of lacerations that originate in childbirth is not usually recommended unless the uterine artery is torn and bleeds. In that case, a trachelorrhaphy is advised as a hemostatic.

The patient should be placed on a table in the dorsal position, with knees separated and bent over her abdomen. A short retractor holds the perineum down, and the cervix is drawn to the vulva by tenaculum forceps. The blood should be wiped out, and the parts douched off with a 1–2000 solution of corrosive mercuric chlorid. The edges of the lacerations, if ragged, should be trimmed with scissors and the parts properly coapted. Then a needle about an inch (three centimeters) long, with a slight curve near the point, and armed with coarse sterilized catgut, should be introduced about one centimeter, one-third of an inch, from the edge of the wound opposite the upper angle, and emerge at the edge of the endocervical mucous membrane, then be introduced at the mucous edge opposite, and emerge at a point on the cervix opposite the first point of introduction. This should be tied tight enough to stop the bleeding. Similar stitches should be placed lower down and about one-fifth of an inch, five millimeters, apart, until the laceration is closed. Chromicized catgut makes the best suture material, because it fulfills the requirements and does not cut the softened and more or less bruised cervix.

The vagina and cervix should be irrigated again with the antiseptic solution, and then with plain sterilized water. The douches should be repeated twice daily.

In view of the fact that these lacerations heal so readily when properly united, it would seem unsurgical not to thus unite all deep lacerations whether they bleed or not, provided aseptic preparations can be had. The time is undoubtedly near when such will be recommended. The operation is so easy that the only surgical talent necessary is an appreciation of surgical cleanliness.

The assistants required are an anesthetizer, an assistant for each knee, and a nurse. The instruments needed are vaginal retractors, needles, scissors, vulsella, a needle holder, and two sponge holders.

9. The *preparatory treatment* necessary for the successful performance of an operation for an old laceration consists in removing the inflammation (part 6, chap. VII,

par. 11, 12, and 13). In case an ordinary trachelorrhaphy is contemplated the erosion should be cured and all cystic follicles destroyed. If this is not done the patient may complain more after the operation than before. When, however, the diseased tissues are all to be excised, such preparatory treatment is unnecessary, for the diseased tissue will be cut away.

All pelvic inflammation outside of the uterus should be cured, or the operation may make it worse, or may result in a failure of the parts to unite.

10. The ordinary operation, *trachelorrhaphy*, also called Emmet's operation, consists in paring the edges of the laceration and uniting them by sutures. It may be done either in Sims' or in the dorso-sacral position (Fig. 3).

The vaginal entrance is held open by Sims' speculum, or by retractors if the patient is on the back, the cervix is pulled as near the vulva as practicable without using force, and held there by a sharp hook or tenaculum forceps in the hands of an assistant. By drawing the cervical walls together with two tenacula, the operator judges of the shape and extent of the tear. He then hooks up the parts a short distance above the lower end of the tear, and with knife or scissors cuts off a strip of tissue along the edge of the tear, and extending up to the angle. He may then, with Emmet's curved scissors, continue denuding the strip across the angle and down the other side, removing all in one piece; or he may commence the denudation of the second side of the tear at the lower end, and denude up the

FIG. 93.—LACERATED CERVIX AFTER DENUDATION. (*After Skene.*)

edge to meet the first strip under the cicatricial plug in the angle. Another way is first to split the cicatricial plug or angle as deep as necessary to get the healthy tissue, and with a knife denude from the angle down each side of the tear. All cicatricial tissue that escapes the first denudation must be hooked up with a tenaculum and cut away. If another laceration is to be operated upon at the opposite side, it should be denuded before any sutures are introduced.

FIG. 94.—SAME AS FIG. 93 WITH SUTURES PASSED.

FIG. 95.—SAME WITH SUTURES TIED.

In uniting deep lacerations in a large hardened cervix, the sutures are introduced at the upper angle of the wound as recommended in par. 8 (small type), but should not be tied until all are passed. Then the parts should be thoroughly disinfected with a $\frac{1}{2000}$ solution of corrosive mercuric chlorid, or the sutures be tied under constant irrigation with the same. The upper one should be tied first, and then the next, and so on. If the cervix be small and soft, and the needle can be made to penetrate both flaps with one puncture, then each suture may be tied as soon as passed. Sometimes the parts can be united more quickly and in better shape by introducing the lower suture first and tying it. The surfaces then retain their position and

the other sutures, each with one sweep of the needle, can be accurately placed and quickly tied.

The vagina is loosely packed with gauze, which is to be removed on the third day. After that a $\frac{1}{2000}$ corrosive chlorid douche should be given twice daily until the sutures are removed. The sutures ought to be left in place two weeks, but may be left longer without harm.

The patient is kept in bed from six to eight days, but should remain rather quiet for another week. She may sit up in bed to urinate.

When both sides are denuded a strip of mucous membrane must be left between them wide enough to make a good cervical canal. If the circular artery be wounded it will be readily controlled by the upper suture.

Silkworm-gut sutures are the best, using fine threads for superficial ones. The ends may be left long to facilitate their removal, those of each row of sutures being tied together.

The instruments needed are: A Sims' speculum and depressor, or one posterior and two lateral vaginal retractors, a sharp hook or tenaculum forceps, two uterine tenacula, a pair of uterine scissors, Emmet's full curved scissors or a knife, straight, sharp-pointed needles one inch (2.5 cm.) long, slightly curved on the end, silkworm-gut sutures, uterine sound, two fountain syringes or douche bags with glass points, one for the antiseptic solution and one for plain sterilized water.

11. When the cervix is so extensively diseased that the denudation of an ordinary trachelorrhaphy does not remove all of the diseased tissue, *Schroeder's modification* of Emmet's method is preferable. This consists first in making the lateral denudations, and then incising the angles as far as the vaginal junction or, if done for cases without lateral laceration, in making a simple incision on each side.

The lips are then widely everted, and the mucous membrane of the lower lip cut squarely across at or near the upper angle of the incision. The mucous membrane and

underlying diseased tissues between the raw surfaces are dissected off with a knife as far down as the mucous membrane is diseased (Fig. 96).

The mucous membrane at the lower edge of the raw surface is united by two or three silkworm-gut sutures to the membrane at the upper edge, thus folding the cervi-

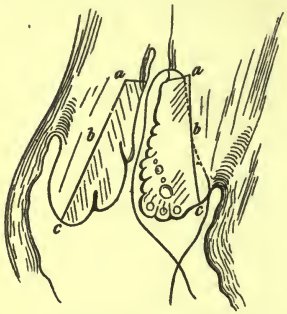

FIG. 96.—LINE OF INCISION IN EXCISION OF THE CERVICAL MUCOUS MEMBRANE. SIDE VIEW. (*Schroeder.*)

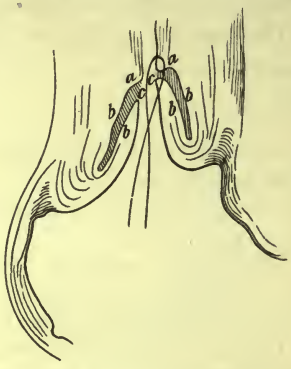

FIG. 97.—PLACING THE SUTURES. (*Schroeder.*)

cal wall and turning healthy membrane into the cervix (Fig. 97). The same is done to the upper lips, and then the angles are trimmed and united as in ordinary trachelorrhaphy.

The instruments required are the same as for trachelorrhaphy, and the after treatment the same.

PART FIVE.

DISPLACEMENTS.

CHAPTER I.

DISPLACEMENTS OF THE UTERUS.

1. The **Normal Position** of the uterus is in the center of the pelvis with the fundus in front of the axis of the

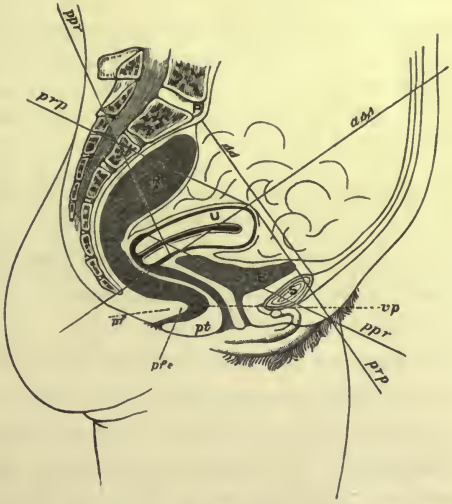

FIG. 98.—NORMAL POSITION OF FEMALE PELVIC ORGANS IN THE VIRGIN.
U. Uterus. B. Bladder. R. Rectum. *pt*. Perineal triangle. *pf*. Pelvic floor. *pfe*. Pelvic floor edge. S. Symphysis pubis. P. Promontory of sacrum. *ppr*. Plane of pelvic roof. *prp*. Plane of pelvic roof projection. *ss*. Superior strait. *ass*. Axis of superior strait.

superior strait and the cervix behind it. The long axis of the uterus forms a slight curve whose concavity faces for-

ward and downward. Its supports are not rigid ones, and the displacements of the fundus backward by a full bladder or of the cervix forward by a loaded rectum are physiological variations.

2. **The Normal Supports.** When no extra pressure is brought to bear upon the uterus it is entirely supported by the surrounding connective tissue. As the peritoneum is reflected over the uterus it is thrown into folds which include a portion of the connective tissue, and are called the sacro-uterine and broad ligaments, and the vesico-uterine folds. These, together with the round ligaments and the vesico-vaginal septum, or pubo-uterine ligament, constitute the *suspensory supports.*

The sacro-uterine ligaments hold the cervix back of the axis of the superior strait, while the round ligaments, gravity, and the intra-abdominal pressure combine to hold the fundus forward. All of the ligaments, particularly the round ligament, contain muscular fibers continuous with those of the uterus. (Bayer.)

3. When pressure is brought to bear upon the uterus, such as straining in lifting, it is forced down on the pelvic floor (part 4, chap. II, par. 3), where its lower end rests, until the pressure ceases, and is then raised to its previous position.

At the pelvic outlet the muscles and fascia of the perineum proper act merely as supplementary supports to the uterus by closing the vaginal, rectal, and urethral outlets.

4. **Classification.** Six kinds of displacements are recognized,—simple displacements, Versions, Flexions, Prolapse, Torsions, and Inversions.

Simple displacements are changes in the location of the uterus without any significant change in its axis. With the exception of Lapsus (chap. V, par. 1), they are not of sufficient intrinsic importance to call for a separate consideration,

and will only be referred to in their relationship with the more important pathological conditions upon which they depend.

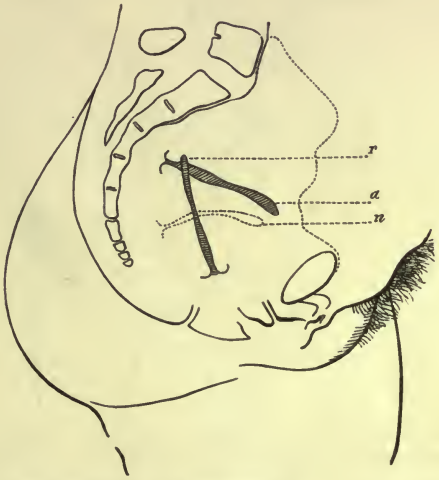

FIG. 99.—ANTEVERSION AND RETROVERSION. ⅓. (*B. S. Schultze.*)
n. Normal position of uterine cavity. *a*. Anteversion. *r*. Retroversion.

5. **Versions** are displacements involving a change in the axis of the uterus. They are (1) a turning forward of the fundus and backward of the cervix, called *Anteversion;* (2) a turning backward of the fundus behind the axis of the superior strait, and a turning forward of the cervix in front of the axis, called *Retroversion*, and (3) tipping sideways, called *Dextro-* and *Sinistro-version*, or right and left lateral versions.

6. **Flexions** are deformities of the uterus, involving an increase or alteration in the normal slight anterior curve of the uterine axis. They are (1) an exaggeration of the normal anterior curve, called *Anteflexion;* (2) a reversal of the normal curve, called *Retroflexion*, and (3) a bending

sideways, called *Dextro-* and *Sinistro-flexion*, or right and left lateral flexion.

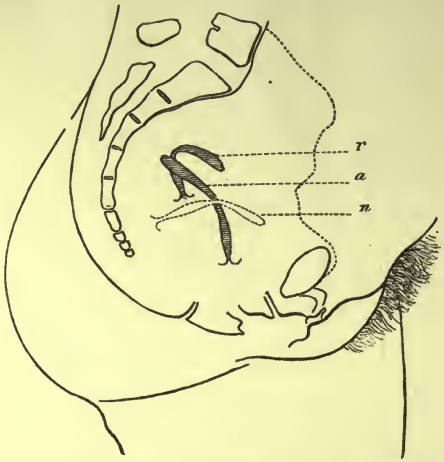

FIG. 100.—ANTEFLEXION AND RETROFLEXION. (*Schultze.*)
n. Normal position of uterine cavity. *a*. Anteflexion. *r*. Retroflexion.

Lateral versions and flexions are nearly always symptomatic of pelvic inflammation and tumors, and will not be given a separate description.

7. **Prolapse** is a displacement of the uterus in the axis of the pelvic outlet. There are two stages, (1) a simple descent in the axis of the pelvic outlet, with approach of the cervix to the vaginal outlet, called simple *Prolapse*, and (2) a protrusion of the uterus through the vulva, called *Procidentia*. Procidentia is said to be *partial* when only a portion of the uterus is outside of the vulva, and *complete* when the entire uterus is outside.

8. **Torsion** is a twisting of the uterus on its long axis, and depends upon conditions similar to those attending lateral displacements.

9. **Inversion** is a sinking of the fundus or upper part

of the uterus into the cavity of the uterus or vagina, the organ being turned either completely or partially inside out.

10. Selecting from the above classification such displacements as demand a separate consideration, we have the following list :—

Anteflexion.
Anteversion.
Retroflexion and Retroversion.
Prolapse, including **Lapsus and Procidentia.**

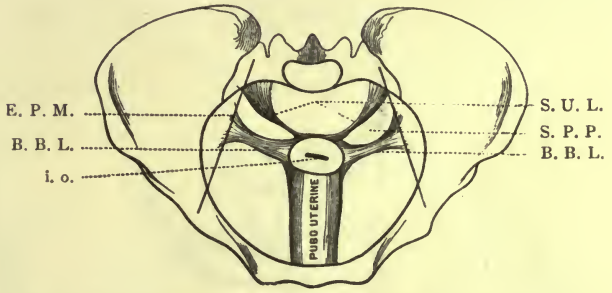

FIG. 101.—UTERINE SUSPENSORY LIGAMENTS ON A LEVEL WITH INTERNAL OS UTERI.

E. P. M. Edge of psoas muscle. B. B. L. Base of broad ligament. i. o. Section of uterus at internal os. S. U. L. Sacro-uterine ligament, surrounding the cul-de-sac of Douglas. S. P. P. Left lateral sacral peritoneal pouch.

CHAPTER II.

ANTEFLEXION OF THE UTERUS.

1. **Mechanism.** The fundus leans normally over the bladder and vesico-vaginal septum, or pubo-uterine ligament, in a position of slight anteflexion. When the sacro-uterine ligaments are too short, the cervix is held too high and too far back in the pelvis, and the fundus is forced by

abdominal pressure and gravity down toward the bladder. If the uterus is straight and rigid, a simple downward and forward inclination beyond the normal will result, *i. e.*, anteversion. If the uterus is flexible, the body will be bent downward and forward by the same forces, while the cervix may also be bent slightly forward by the traction of the vaginal walls. (Fig. 102.)

FIG. 102.—PATHOLOGICAL ANTEFLEXION, CAUSED BY SHORT SACRO-UTERINE LIGAMENTS. (*B. S. Schultze.*)

2. **Pathology.** When the degree of flexion is such as to interfere with drainage of the uterine cavity, or impregnation, it is pathological. When the flexion is greater than normal, and is not straightened by the filling bladder, by menstrual erection, or by variations in the abdominal pressure, the constant pressure on the anterior wall produces more or less atrophy in it, while the posterior wall may become larger and thicker, partly from traction and partly from endometritis, due to the imperfect drainage. In time, the flexion becomes irreducible or permanent, not only from

the want of symmetry of the walls, but from hyperplasia following the endometritis.

3. Shortening of the sacro-uterine ligaments may take place either from the contraction following parametritis posterior or from peritoneal inflammation about them. Sometimes the connective tissue under one of these ligaments is contracted more than the other, and the base of the broad ligament of the same side is also contracted, drawing the cervix a little to one side, thus producing a slight torsion. The posterior wall of the cervix faces toward the side of the contracted sacro-uterine ligament.

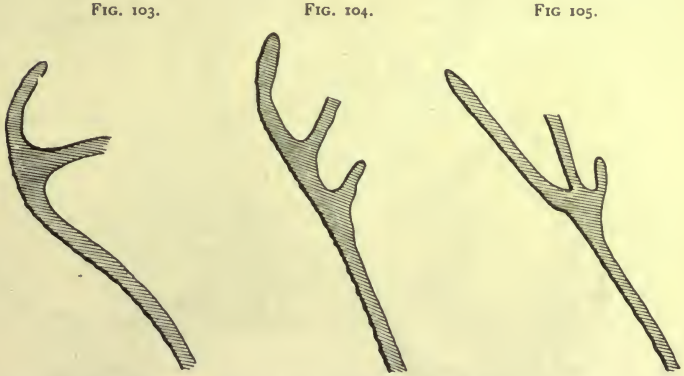

FIG. 103. FIG. 104. FIG 105.

FIG. 103.—NORMAL INSERTION OF CERVIX INTO VAGINA IN ADULT (NATURAL SIZE).
FIG. 104.—APPROXIMATION TO THE CONDITION OF CHILDHOOD, OFTEN MET WITH IN VIRGINS.
FIG. 105.—NORMAL FORM OF CERVIX AND INSERTION INTO VAGINA IN CHILDHOOD. (*B. S. Schultze.*)

When the genital organs do not develop symmetrically or as fast as the pelvis, anteflexion is apt to result. The short sacro-uterine ligaments draw the upper portion of the cervix backward and upward, while the short, poorly developed vagina holds the lower end of the cervix forward, as is normal in young children. The cervix is thus bent

forward into the vaginal axis, and is apt to be elongated and conical, while the poorly developed fundus is pressed over the bladder by abdominal pressure, as well as by gravity. This constitutes puerile anteflexion. (Schultze.)

There may be all degrees of flexion of this kind, from that in which the cervix is in the same position as in childhood to that in which the cervix is drawn farther back, but still retains a slight forward curve.

4. Another variety of anteflexion is that in which either from childbirth, debility, or other causes, the uterine ligaments have become relaxed after the flexion has become permanent. In such cases the anteflexed uterus falls into retroversion or retroposition in the cul-de-sac of Douglas.

FIG. 106.—PUERILE ANTEFLEXION. (*Schultze.*)

FIG. 107.—ANTEFLEXION WITH RETROVERSION OR RETROPOSITION.

5. The **Symptoms** are those of the attending pathological conditions. Dysmenorrhea, amenorrhea, irritability of the bladder and torpor of the rectum are the most frequent ones. The symptoms of endometritis and inflammation in

the posterior pelvic peritoneum and connective tissue are apt to be dominant, such as backache, painful defecation, leucorrhea, anemia, etc. Sterility is common in old cases. The dysmenorrhea in the earlier stages is of the kind described elsewhere as mechanical dysmenorrhea, but in time it becomes more like the inflammatory variety.

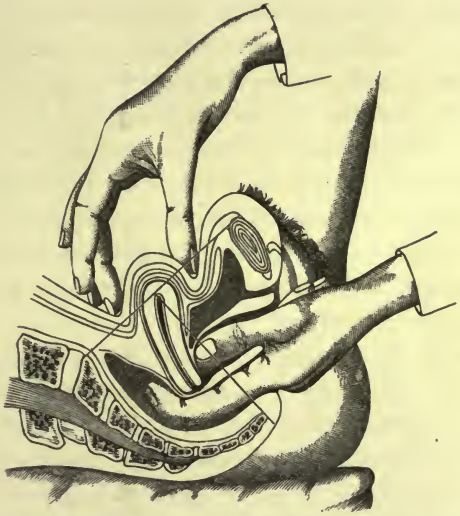

FIG. 108.—BIMANUAL RECTO-VAGINAL EXAMINATION OF THE UTERUS.

6. The **Diagnosis** depends almost entirely upon the physical examination.

The finger in the vagina will find the cervix well back in the pelvis, pointing forward almost in the axis of the vagina, and making an acute angle with it instead of the normal right angle. The angle of flexion can be easily felt, the cervix lying under and the corpus over the finger. Bimanual examination with the thumb in the vagina and the forefinger of the same hand in the rectum, will enable us to

bend and straighten the body on the cervix and determine their flexibility, and also the degree of rigidity and contraction of the sacro-uterine ligaments, and whether the uterus is merely drawn backward by them or whether it is fixed by adhesions in the back part of the pelvis. In puerile cases the conical cervix is held forward in the pelvis by the short anterior vaginal wall, which is less than 2½ inches (7 cm.) long. The posterior vaginal wall is proportionately longer than the anterior. (Figs. 105 and 106.)

Anteflexion with retroversion or retroposition is recognized by the fact that the posterior wall of the cervix can be traced back into the hollow of the sacrum as if there were a retroversion. But the finger in the rectum, either with or without the aid of bimanual palpation, recognizes convexity of the posterior wall of the uterus and detects adhesions if present. The fundus is far back and high up and not easily felt. (Fig. 107.)

It occasionally becomes necessary to use the sound to determine the direction of the canal. In such cases a flexible silver sound, or probe, well curved and used very gently, gives the best satisfaction.

The length of the anterior vaginal wall, or distance of the cervix from the vaginal outlet, is easily measured by placing the finger tip against the cervix *at the vaginal junction*, while the finger is raised against the anterior vaginal wall and the pubic arch. The subpubic ligament should normally impinge against the finger between the second and third joints. The place can be fixed by putting the nail of the finger of the other hand upon the point of impingement, and the distance measured after withdrawal. Normally it should be 2½ inches (7 cm.).

7. The **Prognosis** is ordinarily good in young persons before the uterine walls have become rigid. In puerile cases, and in those with rigidity or with peritoneal adhe-

sions, it is bad. Relief of the worst symptoms can, however, in most cases be attained.

8. **Treatment.** Parametritis posterior and adhesions from recent peritoneal inflammation are benefited by vaginal tamponment. (See part 1, chap. IV, par. 10; also part 6, chap. IX, par. 7.) The tampon next to the cervix should be saturated in a ten per cent. solution of ichthyol in glycerin. The cervix should also be kept systematically dilated, and the endometritis treated (part 6, chap. VIII, par. 16). Massage as described in part 6, chap. XII, par. 10, sometimes acts beneficially in cases of parametritis posterior.

If there be adherent ovaries and tubes about the sacro-uterine ligaments holding the uterus back, these should, after all inflammatory reaction has subsided, be separated by pelvic massage (part 1, chap. V, par. 8, 9, and 10.) If that prove inefficient, they may be separated under anesthesia, in one or more sittings, by the bimanual recto-vaginal manipulation, or, if connected with an accumulation of pus in the pelvis, by a peritoneal section.

Old cases with well-pronounced endometritis, rigidity of the uterus, and dysmenorrhea require a thorough dilatation and curettage (part 6, chap. VIII, par. 16), followed by the passage of a large sound, once a week, or, if necessary, by repeated dilatation and curettage.

Impregnation following such treatment often brings about a complete, or at least symptomatic, cure.

In congenital cases the treatment recommended for puerile uterus may be of benefit (part 3, chap. III, par. 18).

Pessaries are, as a rule, more harmful than beneficial. The only indication for them is to support the uterus so as to prevent traction upon the tender sacro-uterine ligaments or peritoneal adhesions, and a tampon answers that purpose better. Soft rubber inflatable pessaries are the best ones if tampons are not available, but they should be removed and cleansed at bedtime, and reintroduced in the morning.

CHAPTER III.

ANTEVERSION OF THE UTERUS.

1. **Pathology.** Anteversion presupposes subinvolution or hyperplasia of the uterus sufficient to prevent the occurrence of flexion. The subinvolution is nearly always puerperal, and thus occurs while the uterine ligaments are relaxed. When the ligaments contract, the cervix is drawn up toward the second sacral vertebra, and the heavy fundus is forced down on the vesico-vaginal septum. The uterus being rigid, the cervix points back toward the sacrum. The conditions outside of the uterus which constitute the causes are the same as in anteflexion.

2. The **Diagnosis** is easily made by the finger, which finds the hard and enlarged uterus lying over the vesico-vaginal septum and the os pointing toward the sacrum. The lower end of the cervix is over three inches from the sub-pubic ligament. The anterior wall of the vaginal portion of the cervix makes an obtuse angle with the anterior vaginal wall. The bimanual examination demonstrates the inflexibility and hardness of the organ.

3. The **Symptoms** are the same as those of anteflexion, with greater tendency to vesical irritability and less tendency to dysmenorrhea.

4. The **Treatment** is the same as that of anteflexion, with the addition of the treatment of subinvolution (part 6, chap. IX, par. 7).

CHAPTER IV.

RETROFLEXION AND RETROVERSION OF THE UTERUS.

(*Alexander's Operation, Vaginal Fixation of the Uterus, Hysterorrhaphy, Separation of Adhesions.*)

1. **Mechanism.** When the cervix uteri is displaced forward, the long axis of the uterus is approximated to that of the axis of the superior strait. If under these conditions the bladder be overfilled, or if the patient exert herself while she is lying down or leaning back, the fundus is forced back-

FIG. 109.—RETROFLEXION (SLIGHT).

FIG. 110.—EXTREME RETROFLEXION OF THE CERVIX DUE TO INFLAMMATORY CONTRACTION ON THE POSTERIOR SURFACE OF THE UTERUS.

ward by abdominal pressure, and gravity will tend to carry the fundus toward the hollow of the sacrum, thus producing retroflexion if the uterus be flexible, and retroversion if the uterus be rigid.

2. **Pathology.** The uterus may be of normal flexibility and lie with the fundus bent back in the cul-de-sac of Douglas, forming a curve whose concavity faces downward and backward (retroflexion), the sacro-uterine ligaments not being long enough to permit the cervix to straighten out. Changes similar to those described in the pathology of anteflexion may occur with impaired function, endometritis, hyperplasia, and permanent or irreducible flexion.

In other cases the hyperplasia and rigidity precede the displacement. The uterus then remains straight, and does not allow the sacro-uterine ligaments to contract, and the position is one of retroversion.

In another class of cases a permanent anteflexion has developed first, and the uterus takes the position of retroversion with anteflexion. (Fig. 107.)

Fig. 111.—Congenital Retroversion. (*Schultze.*)

In still another class the vagina remains undeveloped (congenital), or it undergoes senile atrophy, and the cer-

vix is held so far forward by the short vagina that the fundus is tipped back into the cul-de-sac. The sacro-uterine ligaments are at the same time relaxed, and the uterus falls back without flexion, or may be slightly anteflexed so as to fit in the concavity of the cul-de-sac. The cervix is usually elongated and conical and the corpus short, or puerile. The infantile uterus is apt to be thus retroverted. (Fig. 111.)

In a few cases a contraction in one of the broad ligaments not only prevents the fundus of a rigid uterus from leaning over the bladder, but it tips the corpus far enough back to enable the abdominal pressure to carry the fundus against the sacrum. The organ can be replaced by force, but it retroverts as soon as released.

Finally, a primary enlargement of the anterior wall or shrinkage of the posterior wall may exist.

Surrounding peritoneal inflammation and exudates are often present, and the uterus is held in fixed retroversion or retroflexion without reference to its flexibility.

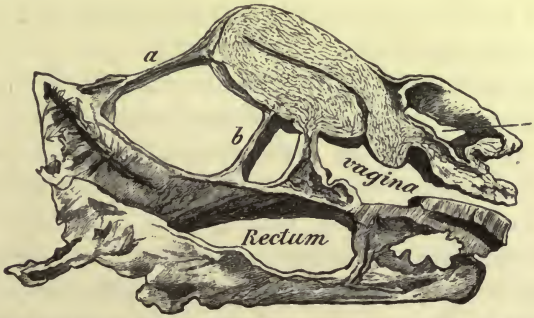

FIG. 112.—RETROFLEXION WITH ADHESIONS (*a* and *b*) BETWEEN UTERUS AND RECTUM. (*Winckel.*)

3. **Etiology.** The cause of ninety per cent. of cases is relaxation of the sacro-uterine ligaments (B. S. Schultze)

due to constipation, general weakness, but particularly to post-partum conditions. The uterus remains too heavy after labor, and the uterine ligaments continue relaxed and subinvoluted from inflammatory changes starting in the uterus or cervix. Lacerations about the vaginal entrance, and a sagging of the vesico-vaginal septum, remove some of the normal support of the cervix and also tend to drag it forward, while overfilling of the bladder forces the fundus back.

Cicatricial contraction in the anterior vaginal wall, due to laceration or sloughing following labor, contraction from senile atrophy, and a congenital shortness of the vagina cause the trouble by holding the fundus forward. (Fig. 111.)

Subinvolution of the anterior uterine wall, due to adhesion of placental tissue (E. Martin) and the contraction of posterior inflammatory exudates following lacerations of the cervix, puerperal endometritis, salpingitis, etc., may bend or turn the uterus backward and hold it there indefinitely.

4. **Symptoms.** A sudden displacement is usually signaled by a feeling of discomfort or pain in the pelvis, a desire to urinate and defecate, and sometimes by the symptoms of metritis and peritonitis. Constant pelvic discomfort is felt for several days.

5. Backache, irritability of the bladder, menorrhagia and dysmenorrhea, which may last during the greater part of the monthly period, are ordinary symptoms of retroflexion and retroversion. These, together with leucorrhea, painful defecation and urination, iliac, gluteal, and sciatic pains, which are sometimes present, are ordinarily the result of an accompanying chronic endometritis, ovaritis, or peritonitis with adhesions. Pressure of the fundus upon the sacral plexus occurs in rare cases in which the uterus is enlarged and the pelvic tissues greatly relaxed. In some cases no symptoms, or only one or two, are noticeable.

Sterility is present in most cases of long standing, but is due to the associated disease rather than to the displacement.

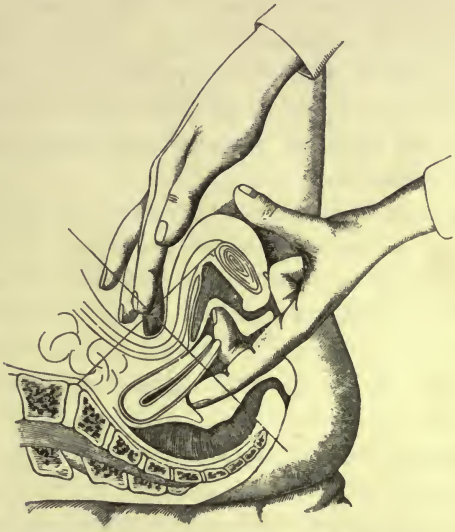

FIG. 113.—BIMANUAL PALPATION OF THE UTERUS FROM THE POSTERIOR VAGINAL WALL.

6. **Diagnosis.** In cases of retroversion the cervix will point toward the vaginal outlet, and the finger which touches the displaced cervix will impinge against the subpubic ligament at or below the second joint. The fundus will usually be felt behind the cervix, extending backward almost in a straight line.

In cases of retroflexion the cervix is usually slightly displaced forward, and the corpus can be felt in the posterior fornix, making an angle with the cervix. As it is possible that the body felt in the fornix may be a tumor or exudate attached to the uterus, or that a retroversion may exist with the fundus lying over the tumor or exudate, instead of

between the sacro-uterine ligaments, it is better to examine bimanually in all cases. With two fingers in the vagina and the other hand pressed over the pubes and deep into the pelvis, the presence or absence of the fundus over the body felt in the cul-de-sac of Douglas can be determined. (Fig. 113.) Two fingers in the rectum can be made to approach the hand pressed down from above, and the entire pelvic cavity be explored, and the shape and position of the uterus determined.

In some cases it becomes necessary to introduce the uterine sound to ascertain where the cavity of the uterus is, and whether it is in the mass felt behind the uterus or above it. Gentle movements of the sound while a finger is in the vagina show whether the uterus is freely movable, and whether the mass behind the uterus moves with it.

7. **Prognosis.** Recent cases in which the pathological conditions can be removed are often cured. In long-standing cases the uterus can seldom be restored to its normal relations, but the fundus may be artificially fixed in front of the pelvic axis by operative measures, and thus an imperfect kind of cure effected. Puerile retroversion is seldom curable unless pregnancy takes place and develops the vagina sufficiently for the cervix to be held back of the axis of the superior strait.

8. **Treatment.** Two things are to be accomplished by treatment: (1) to cure the pathological conditions upon which the displacement depends, and (2) to replace the uterus, and keep it in place.

Inflammatory or cicatricial contractions must be overcome by the treatment of the inflammation and stretching of such contracted tissues as can be stretched either by uterine massage or vaginal packing in the knee-chest position.

Cicatrices involving the vaginal wall must sometimes be cut. Placental remains or tumors should be removed if present.

Old rigid flexions with endometritis or subinvolution should be treated by dilatation of the cervix with sounds, and intrauterine treatment, or by forcible dilatation and curettage (see part 6, chap. VIII, par. 16 to 20). When there are symptoms of recent inflammation in the pelvis, hot vaginal douches, ichthyol and glycerin tampons, and counterirritation over the iliac and sacral regions by tincture of iodin should first be employed.

Relaxation of the sacro-uterine ligaments or general pelvic connective tissue, may be benefited by both local and general treatment. Forcible dilatation and curetting may be required for endometritis. When the uterus is flabby, intra-uterine bipolar faradism, stimulating applications to the endometrium, such as strong carbolic acid and the solution of ferric chlorid, increase the tonicity of uterine fiber and to a certain extent of the surrounding connective tissue, into which uterine muscular fibers extend. Cold vaginal or rectal douches, used for a few moments three or four times daily, and cold enemas are useful adjuvants. Pelvic massage after Thuré Brandt's method may be made to accomplish much.

Peritoneal adhesions not overcome by massage should be separated if practicable by the aid of anesthesia.

In giving pelvic massage for retroversion the uterus is replaced and elevated the same as will be described (chap. V, par. 11) for prolapse, the main difference being that the uterus is not raised so high in the pelvis, and is allowed to escape from the assistant's hands quite suddenly in order to stimulate the round ligaments to contract after being thus stretched.

Adhesions that are of recent origin and are not connected with pus accumulations in the pelvis can frequently be separated by the

bimanual recto-vaginal manipulation (Fig. 108) while the patient is anesthetized. (Schultze.) The parts are steadied by the hand on the abdomen while the finger in the rectum seeks to force itself between the uterus or its appendages and the pelvic wall or uterine ligament to which they are attached. Adherent tissues must never be pulled apart for fear that laceration may occur. By pressing the fundus toward the symphysis all restricting bands or tissues are rendered tense and serve as guides to farther efforts.

When adhesions have been separated the patient should remain in bed for several days and an ice-bag be kept on the abdomen for the first twenty-four or thirty-six hours.

9. The *general treatment* consists in cod-liver oil, cream, bacon, and other fatty foods for emaciated patients, iron for the anemic, and strychnia for those of relaxed fiber. Massage, particularly of the abdominal region, Swedish movements, active out-of-door exercise, and electricity, both general and local, may be made to contribute to the end in view.

10. Before *replacing the uterus* all acute inflammation and pelvic tenderness must be removed, and all adhesions separated. After that has been done, the symptoms often disappear and the correction of the malposition may not be necessary.

11. The uterus can be replaced bimanually, by the sound, or by postural treatment.

To replace it bimanually, two fingers are introduced into the vagina with the forefinger in front of the cervix and the middle finger in the posterior fornix. The middle finger pushes up the fundus, and also *draws* the upper part of the cervix back in the pelvis by pushing back the posterior vaginal wall toward the sacrum, while the forefinger pushes the lower end of the cervix backward, thus prying the upper end of the uterus forward by using the attachment of the anterior vaginal wall as a fulcrum. When the fundus gets

FIG. 114.—BIMANUAL REPOSITION OF RETROFLEXED UTERUS.

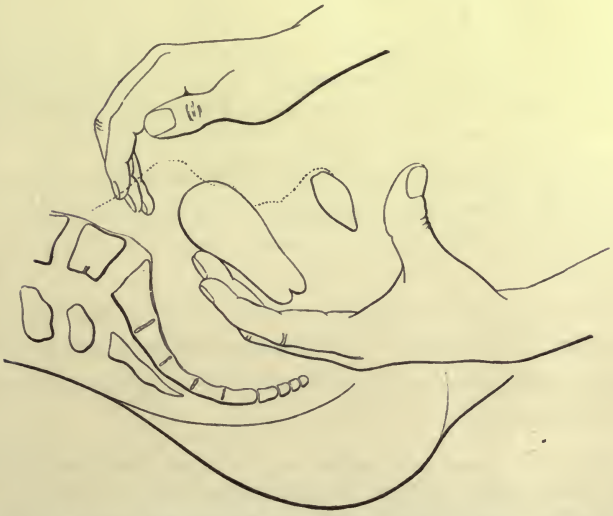

FIG. 115.—BIMANUAL REPOSITION OF THE RETROFLEXED UTERUS: THE EXTERNAL HAND TAKING CHARGE OF THE FUNDUS.

above the promontory of the sacrum, it is caught by the abdominal hand, pressed between it and the promontory, and brought forward over the bladder. Also by passing

Fig. 116.—Bimanual Reposition of the Retroflexed Uterus Completed.

two fingers in the rectum, the fundus may be pressed up toward the promontory, and the replacement be aided by the thumb in the vagina pressing the cervix backward. (Fig. 115.)

When the uterus is flabby and the cervix small, an intrauterine stem (Fig. 117) may be introduced, and the fundus pried above the promotory, by pushing the lower end backward.

This is a very easy and certain way of determining whether the uterus is replaceable or not. It should be preceded by a 1–2000 corrosive mercuric chlorid douche, to prevent infection of the endometrium.

12. Replacement with the sound requires great care to avoid injuring the endometrium or introducing sepsis, and is not generally employed.

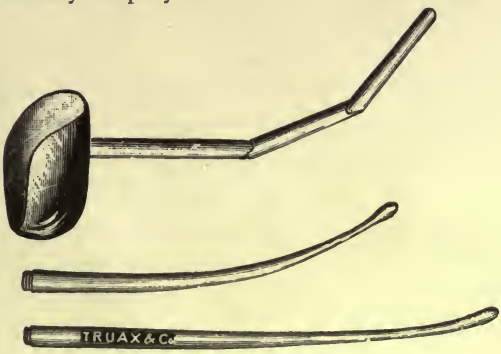

FIG. 117.—THE AUTHOR'S STEM REPOSITOR.

The sound is introduced with the convexity backward, and then the handle made to sweep upward in a curve, until the convexity is turned forward and upward, without changing the position of the point of the sound or of the uterus. Then, by depressing the handle, the fundus is pried upward and forward with great gentleness. Decided resistance should cause us to abandon the effort. Antiseptic douches should be used before and after the attempt. (Figs. 118 and 119.)

13. The uterus may be replaced by putting the patient in the knee-chest position (Campbell), admitting air to the vagina, and pushing the fundus toward the promontory of the sacrum with a hard instrument like a drumstick, or by maneuvers similar to those described in paragraph 11 for bimanual replacement. When the fundus is dislodged from the hollow of the sacrum, gravity completes the replacement. This is a good method for replacement of the pregnant uterus.

It should be remembered that the normal attachments of the uterus are mainly about the upper part of the cervix, and that the uterus is thus a double lever with a somewhat movable fulcrum at or

near the internal os. To press the lower end of the cervix back, means to tip the fundus forward, and *vice versa*.

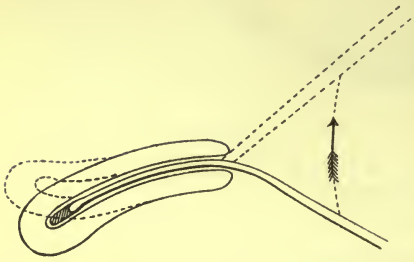

FIG. 118.—ROTATION OF SOUND PREPARATORY TO REPLACEMENT OF UTERUS.

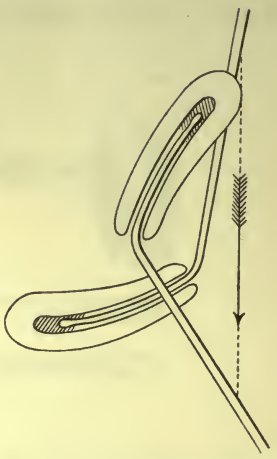

FIG. 119.—REPLACEMENT BY DEPRESSING THE HANDLE.

14. If the uterus has been suddenly and recently displaced, a vaginal tampon to hold the cervix back may suffice for a cure. In most cases a support or pessary made of hard rubber will be required.

FIG. 120.—ALBERT SMITH PESSARY.

FIG. 121.—THOMAS' RETROFLEXION PESSARY.

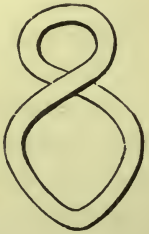

FIG. 122.—SCHULTZE'S FIGURE-OF-EIGHT PESSARY.

The most useful pessary is the Hodge lever pessary in

one of its modified forms, the Albert Smith, Emmet, Thomas, or Fritsch.

Schultze's figure-of-eight and Fritsch's pessaries are good when the posterior vaginal fornix is relaxed and a more direct action upon the cervix is required.

The uterus should be replaced before the pessary is introduced, and the patient examined immediately afterward, and then in a day or two again, to ascertain whether the fundus remains forward or not.

A pessary must, however, not only hold the uterus in place, but should cause no discomfort.

While a pessary is being worn, a copious vaginal douche should be used, if possible, once daily. If that be impracticable, an antiseptic douche (1–2000 corrosive mercuric chloride or potassium permanganate) may be used two or three times a week.

The patient should be examined at least once in three months, and the pessary taken out, cleaned, and replaced every three or six months.

FIG. 123.—INTRODUCTION OF PESSARY OVER THE SOUND.

The easiest method of introduction of a pessary is over a sound that holds the uterus in place, the posterior arm being under the sound in order to pass behind the cervix.

As the introduction of the sound is objectionable, it is preferable

to replace the uterus and hold the fundus forward over the bladder by the hand on the abdomen (Fig. 116), while the forefinger of the other hand is hooked into the ring of the pessary from below over the posterior arm, and pushes it under and behind the cervix. If the posterior arm is not thus held down by the finger it will slip up in front of the cervix and throw the uterus back into its old malposition. (Fig. 124.)

FIG. 124.—PUSHING POSTERIOR ARM OF PESSARY BEHIND THE CERVIX.

As a rule, the more voluminous the vagina and the more relaxed the outlet, the greater must be the pelvic curve of the pessary in order to be retained. The pessary should be just large enough to hold the uterus in place, and to be kept entirely within the vagina during the action of abdominal pressure. When the posterior vaginal fornix is voluminous the thick posterior bar of Thomas' modification will sometimes fill the posterior fornix and suspend the cervix better than the other varieties.

In fitting a pessary in difficult cases, the soft rubber flexible pessaries may be modeled to suit the case, and after having been thoroughly tried, can be copied in hard rubber, which does not become offensive as easily and is more durable.

15. Both for the purpose of rendering the pessary more efficient, and of giving firmness to the tissues that keep the cervix in place, lacerations of the cervix and perineum should be repaired, the vaginal outlet narrowed, and the pelvic floor raised for some distance inward, by carrying the denudations well up into the posterior sulci (part 4, chap. 11).

16. When a pessary fails to permanently cure the displacement, or when the uterus is replaceable, but cannot be held in place by a pessary, operations may be performed to accomplish the purpose.

Shortening the round ligaments, or *Alexander's operation*, is

the best one for cases dependent upon relaxation of tissue, and not connected with adhesions or contractions in the pelvis that might drag upon the body of the uterus after it had been replaced over the empty bladder. The fundus is held over the bladder, while the uterus assumes more nearly normal relations than after any other operation, and is held in place by abdominal pressure.

Alexander's operation is one of the most delicate operations in gynecology, and is liable to prove a failure unless performed for definite conditions. The steps are as follows: Incision three to five centimeters, one to two inches, long, over the spine of the pubes and along the upper edge of Poupart's ligament. Division of the intercolumnar fascia and seizure of the tissues that lie against the external column and Poupart's ligament with forceps or blunt hook. Traction on tissues and snipping of fascial bands until ligament can be seen and felt to draw from the internal ring, or until it *runs*. Same procedure on the other side. Replacement of uterus with sound. Drawing out first ligament until it moves the sound in the uterus, and suturing with buried silk-worm gut to the external inguinal ring, and also firmly into the wound by the external sutures. Same procedure on the other side. Introduction of pessary, to be left for three months. The patient remains in bed for three weeks.

H. P. Newman makes a small incision into the fascia over Poupart's ligament so as to enter the inguinal canal near the internal ring, and seizes the ligament where it is of good size and can be more easily recognized.

Uterine curettage, trachelorrhaphy, and perineorrhaphy may, if indicated, be performed at the same sitting, just before the Alexander's operation.

Instruments: Knife, small retractors, tissue forceps, small scissors, uterine sound, blunt hook, six hemostatic forceps, needle-holder, needles, silk-worm gut, pessary, etc.

17. *Vaginal fixation of the uterus* (Duerssen, Mackenroth) consists in making a median incision in the anterior vaginal wall, separating the bladder from the uterus and vagina, and stitching the anterior uterine wall to the incision in the anterior vaginal wall. It accomplishes the pur-

pose in most cases, and may be done in connection with plastic operations. Bladder symptoms are sometimes troublesome for a while.

Vaginal fixation may be done as follows: Median line incision in the anterior vaginal wall from the neck of the bladder to the cervix, meeting a short transverse incision just above the cervix. Separate the bladder from the vagina on either side of the incision with the fingers, and from the uterus as far as the peritoneal reflexion; draw the bladder away from the uterus so as to reflect the peritoneum still farther from the uterus if possible, and also from the bladder, catching the anterior uterine wall higher and higher with tenaculem forceps or provisional sutures. Stitch the fundus to the anterior vaginal wall behind the bladder by means of the silk-worm gut sutures that also close the vaginal wound. Introduce pessary. The after-treatment is the same as after other plastic operations.

Instruments: Perineal retractor, sharp–pointed scissors, tenacula, tenaculum forceps, uterine sound, catheter, hemostatic forceps, needle-holder, sponge-holders, needles, suture material, pessary, etc. Dorso-sacral position.

18. *Abdominal section* (celiotomy, laparotomy) may be required to separate adhesions. In such cases the most certain way to hold the uterus forward, is to sew the fundus to the anterior abdominal wall (hysterorrhaphy, hysteropexy) by means of two buried chromicized catgut sutures passed transversely through the upper portion of the anterior uterine wall and through the fasciæ at the lower edge of the abdominal wound, or by passing the two lower external sutures through the uterine wall. If the appendages have been first removed, they may be sutured to the peritoneum and subperitoneal fascia on either side of the incision, and only one suture need be passed through the uterine wall. This method holds the uterus up firmly, but does not restore it to a position as natural as that following Alexander's operation.

When the abdomen is open, the round ligaments may be shortened within the peritoneal cavity. W. Gill Wylie recommends to scrape the inner surface of the ligament on either side, and fold the raw scraped surface together, and unite the parts by three fine silk sutures. A. P. Dudley folds the ligaments inward, so as to bring them together in front of the fundus, and stitches them thus folded to the anterior wall of the uterus. The results are not as good as those of Alexander's operation and hysterorrhaphy.

A fold may sometimes be made in the sacro-uterine ligaments, either through an abdominal or vaginal incision in such a manner as to shorten them and hold back the cervix. The results have, as a rule, been imperfect. The recto-uterine pouch is obliterated, but the fundus leans over it.

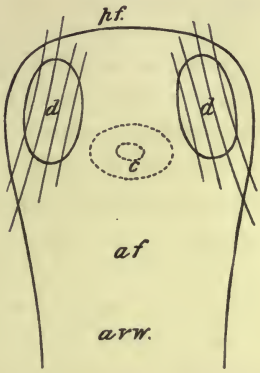

FIG. 125.—OVAL DENUDATIONS IN LATERAL POSTERIOR VAGINAL FORNICES FOR THE PURPOSE OF DRAWING THE CERVIX BACKWARD.

c Cervix uteri, in section. *p f.* Posterior vaginal fornix. *a f.* Anterior vaginal fornix. *a v w.* Plane of anterior vaginal wall. *d d.* Denudations, with sutures passed.

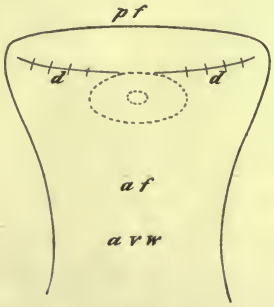

FIG. 126.—Same as FIG. 125. SUTURES TIED.

In mild cases the cervix may be drawn back by means of oval denudations, one on each side of the cervix and extending backward, to be drawn together by sutures passed antero-posteriorly. (See Figs. 125 and 126.) The cervix has also been stitched to the denuded posterior vaginal fornix, its posterior surface having been first denuded.

Hochenegg has in one case separated the adherent retroverted uterus through a sacral incision. The fundus afterward lay over the obliterated cul-de-sac of Douglas. The end hardly justifies such means.

CHAPTER V.

PROLAPSE OF THE UTERUS AND PELVIC ORGANS.

LAPSUS, ENTEROCELE.

1. **Mechanism.** The pelvic organs are surrounded by connective tissue, and all parts of them are supported by it. Into this connective tissue muscular fibers penetrate, rendering it not only stronger and exceedingly elastic, but giving it a quality by which it develops and loses strength and elasticity according to circumstances.

When the strength and elasticity of this tissue as a whole is diminished beyond a certain limit, the vagina loses its firmness, and the uterus is not well sustained against abdominal pressure, and may be forced under circumstances involving increased abdominal pressure toward the flabby vaginal entrance. It descends in the axis of the pelvic outlet, becomes *prolapsed*, and may protrude at the vulva, covered by the inverted vagina and accompanied by a portion of the bladder, forming a *procidentia.* This is usually the mechanism in nulliparæ and sometimes in multiparæ.

When the connective tissue about the pelvic outlet is relaxed or in part destroyed by traumatism or disease, the perineum is also relaxed and the lower end of the anterior or posterior vaginal wall, or of both, press down to fill the outlet, forming anterior and posterior colpocele. When the tissues at the neck and base of the bladder are relaxed or injured, the urethra, or both the urethra and bladder, covered by the stretched vaginal wall, are forced into the yielding vulva, or even beyond it, producing *urethrocele* or *cystocele.* When the tissues about the lower curve of the rectum and

perineum are similarly incapacitated, the recto-vaginal septum protrudes with the posterior vaginal wall, producing *rectocele*.

When the tissues about the uterus are lacking in firmness, and the organs at the vaginal entrance are prolapsed, the cervix is dragged forward by them while the abdominal pressure forces the uterus into retroversion, or down to or through the vulva after them.

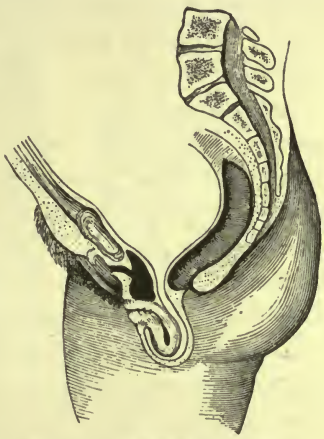

FIG. 127.—COMPLETE PROCIDENTIA UTERI, WITH THE USUAL RETROFLEXION. (*Schroeder.*)

When the vagina is abnormally short, or is prolapsed, but the uterus is kept well back in the pelvis, the traction on the cervix may cause the latter to relax and become more or less infiltrated with connective tissue, and stretch down toward or through the vulva, producing *prolapse* or *protrusion* of the *cervix*, also called hypertrophy of the cervix, although there is usually but little increase of cervical tissue.

When the tissues about the uterus are moderately but symmetrically weakened, or the weight of the normally-shaped uterus is increased, while the parts about the vaginal entrance are firm, the uterus sinks down in the axis of the superior strait, and the cervix approaches the coccyx, forming *lapsus*.

When the bladder is separated from the cervix (a rare occurrence), the intestines are forced down against the relaxed anterior vaginal fornix, producing *anterior enterocele*. When the cul-de-sac of Douglass is distended, the intestines may

be forced down beyond the cervix and be held in a pouch formed by the posterior vaginal wall, producing *posterior enterocele.*

2. **Pathology.** Procidentia uteri, or protrusion of the uterus, involves a more or less complete inversion of the vagina. The inverted vaginal walls become rough and hard, and occasionally are somewhat like the surface of the skin. Ulceration from friction against the thighs and clothing may take place. The cervix which, on account of relaxation and descent of the vaginal attachment, as well as more or less ectropion due to the resistance of the inverted vagina to further prolapse, often looks more like a depression in the mass than a projection from it, and is apt to be ulcerated or eroded. Endometritis and subinvolution are common. The cervix is usually elongated, but contracts and becomes shorter when the uterus is replaced. The bladder is partly without and partly within the pelvis, the urethra passing downward into the protruding portion. The rectum is seldom extensively prolapsed. The peritoneum comes down to or beyond the vulva with the posterior surface of the uterus. The bladder is but seldom separated from the cervix. Urethritis and cystitis due to retention of the urine in the pouch formed by the curved urethra or by the prolapsed portion of the bladder, and also hydronephrosis and nephritis due to obstruction of the displaced ureter, or to ascending inflammation, are occasionally met with. The broad ligaments with the uterine adnexa are drawn down into the peritoneal funnel formed by the prolapse, and are in a state of extreme tension, which interferes with the return circulation. A passive engorgement of all of the prolapsed tissues is the rule.

3. Prolapse of the parts due to hypertrophy and elongation of the cervix is one of the most common forms, and

constitutes a special variety. In such cases the fundus may be at the normal elevation, or only slightly depressed, while the cervix reaches or protrudes at the vulva. (Hugier.) The hypertrophy and elongation may be of the vaginal

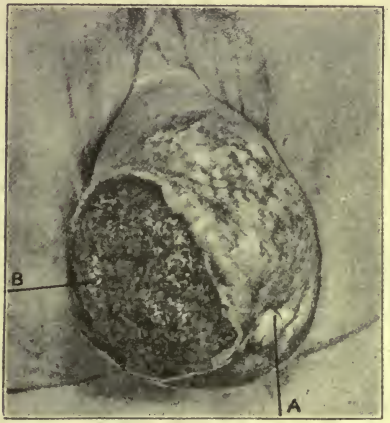

FIG. 128.—SAME MALPOSITION AS FIG. 127, SHOWING ALSO THE ULCERATION OF THE LABIA.

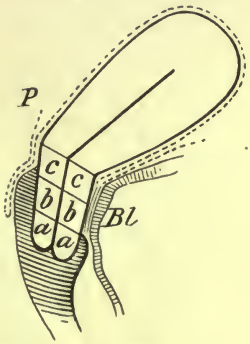

FIG. 129.—DIVISION OF THE CERVIX INTO THE VAGINAL, INTERMEDIATE, AND SUPRA-VAGINAL PORTION. (*Schroeder.*)

a. Vaginal portion. *b*. Intermediate portion. *c*. Supravaginal portion. P. Peritoneal cavity. Bl. Bladder.

portion, or of that portion which is supravaginal in front and vaginal behind, or (seldom) of that portion which is entirely supravaginal. (Fig. 129.)

When the vaginal portion alone is elongated there may be no perceptible prolapse of the vagina. (Fig. 130.)

When the intermediate portion is elongated the anterior vaginal wall and bladder are prolapsed, but the posterior vaginal wall is not. (Fig. 131.) The peritoneum is remote from the vulva in all cases of hypertrophy of the intermediate and lower portions of the cervix—the longer these parts, the further away is the peritoneum.

4. **Etiology.** The causes of prolapse are such as lead to relaxation of the uterine and vaginal supports. Virgins

are the least subject to it, child-bearing women of the working classes the most. Lapsus and retroversion of the uterus predispose to prolapse, but, on account of a firmness or rigidity of some of the supporting tissues, do not usually terminate in it.

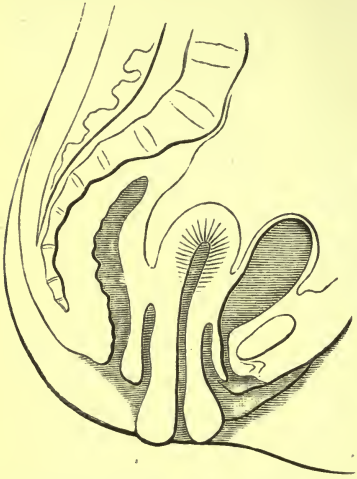

FIG. 130.—PROTRUSION OF THE CERVIX WITH HYPERTROPHY OF THE VAGINAL PORTION. (*After Graily Hewitt.*)

FIG. 131.—PROTRUSION OF CERVIX WITH HYPERTROPHY OF THE INTERMEDIATE PORTION. (*Graily Hewitt.*)

In nulliparæ an overdistended bladder, obstinate constipation, dysentery, whooping cough, pelvic tumors, weakening of the tissues by cachectic conditions, old age, etc., produce relaxation, and the sudden or abnormal action of abdominal pressure, as in coughing or straining, particularly while the bladder is full, may bring on the condition either gradually or suddenly.

In child-bearing women the injury attending, or relaxation following, abnormal labors, together with the subsequent abdominal pressure that goes with laborious exercise, are responsible in the majority of cases.

Retroversion is a condition favorable to the occurrence of procidentia. In some cases the absorption or stretching of adhesions removes the only barrier to its occurrence.

5. **Symptoms.** When the prolapse comes on suddenly, a feeling of faintness with pain in the lower abdomen is experienced, followed by nervous disturbances or even prostration.

In the cases which develop gradually, there may exceptionally be no symptoms. Ordinarily backache, bearing down and dragging sensations about the vulva, and a disagreeable feeling of weakness, or want of support, are noticeable. Difficulty in urinating and defecation, and even the symptoms of urethritis and cystitis, are prominent in some cases of procidentia. Local irritation and ulceration of the protruding mass may give rise to great discomfort. Leucorrhea is common. Menstruation may be either profuse or scanty.

Nervous symptoms and gastro-intestinal derangements, such as have been described among the symptoms of endometritis, are occasionally experienced.

6. **Diagnosis.** Urethrocele is known by a sagging or protrusion of a small sensitive mass under the pubic arch. The catheter or sound enters into it as into a pouch, and may then be turned up so as to pass through the undilated neck of the bladder.

Anterior and posterior colpocele form one or two more or less rugated vaginal folds, visible through the relaxed vulva.

Cystocele produces a soft tumor-like body, which, when the patient is asked to bear down, increases in size and pushes out through the vulva. The anterior vaginal wall is smoothly stretched over it. The catheter passes into it, instead of over it as in anterior colpocele. Rectocele is

distinguished from posterior colpocele by passing the finger through the anus into the prolapsed tissues.

7. When the cervix is elongated, the extent of the vaginal displacement as felt by passing the finger into the anterior and posterior vaginal fornices, informs us which portion is affected. Thus, if the fornices remain deep while the cervix is at the vulva, there is an elongation of the vaginal or lower portion of the cervix. If the anterior fornix is entirely obliterated, and the posterior normal in depth, the intermediate portion of the cervix must be elongated. The uterine sound in either of these cases passes to a depth greater than three inches, or eight centimeters. Bimanual rectal palpation reveals the fundus almost normally high in the pelvis. If both fornices are obliterated and the uterine cavity much deeper than normal, the supravaginal portion is probably elongated. Bimanual rectal examination finds the fundus high up and tapering down to a long, narrow cervix.

8. When the whole uterus is prolapsed the fundus may be felt low down in the pelvis by the finger introduced into the rectum. The uterus can be pushed back to a normal position and palpated bimanually, and thus its size and shape determined.

If there is procidentia the vaginal walls are turned out when the patient strains or stands up. Sometimes the posterior vaginal wall is not entirely prolapsed, and the finger passes in a short distance over the perineum. The everted os is apt to be seen and felt as an eroded funnel-shaped depression into which the sound passes. The catheter introduced into the bladder and the finger into the rectum reveals the relative location of these viscera. The bimanual rectal examination demonstrates the absence of the uterus from the pelvis.

Except in cases of hypertrophy of the intermediate and lower portions of the cervix, the peritoneum may be expected to descend with the posterior wall of the cervix and posterior vaginal fornix. Intestines seldom come down.

9. Anterior enterocele may be discovered by pushing the cervix back in place and palpating the ureters and interureteric ligament bimanually. These tissues will be further removed than normal from the cervix, and the intestinal gurgling can be felt behind them and in front of the cervix. Posterior enterocele is recognized by the large size and resonant percussion note of the soft, tumor-like mass covered by the posterior vaginal wall. The finger introduced into the rectum ascertains that it is not a rectocele.

10. **Treatment.** The displacements under consideration may be treated by pessaries or by operations. Pessaries

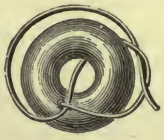

FIG. 132.—INFLATABLE RUBBER RING.

FIG. 133.—INFLATABLE RUBBER BAG.

FIG. 134.—ELASTIC RING PESSARY.

FIG. 135.—SCHULTZE'S SLEIGH PESSARY.

are of palliative value only, but may be employed preparatory to operations, or when operations are inadmissible.

The patient may learn to keep the parts in place by

packing the vagina, or having a friend pack it, every twenty-four or forty-eight hours with wool or strips of iodoform gauze, introduced in the knee-chest position. When this fails, an inflatable or an elastic rubber ring (Peaslee, Mayer, Dumont-Pallier) may answer. Cystocele and anterior enterocele may be corrected by Schultze's sleigh pessary, or a well-curved Hodge, or Gehring's so-called anteversion pessary. Braun's Colpeurynter, or a thin, inflatable rubber bag is often efficient, and can be introduced and removed daily by the patient. Various forms of pessaries with external support have been found useful, but they are troublesome, may exert injurious pressure, and do not always hold the uterus in a good position.

In cases of hypertrophy of the cervix with but little displacement of the fundus, a well-adjusted pessary helps to reduce the enlargement.

The danger of injurious pressure, resulting in ulceration or perforation of the vagina or rectum, should always be kept in mind.

11. Thuré Brandt's method of uterine massage has in his hands cured 70 to 80 per cent. of cases in from two to six weeks. Frequently a moderate retroversion is substituted for the prolapse. The treatment should be given daily. It consists (1) in replacing the uterus and then raising it as high up above the pelvis as possible, (2) in massaging the uterus and ligaments bimanually, and (3) in artificial exercise of the pelvic muscles.

The patient, with nothing on but a loose, thin garment, lies on a couch with shoulders slightly elevated and knees drawn up. The surgeon sits at her left side, passes the left index finger into the vagina, with the other fingers extended between the buttocks, places the uterus in anteversion, and holds the cervix back and high up in the pelvis (Fig. 136). The assistant's hand is then pressed down behind the pubes until it feels that of the operator. Then both hands

push the uterus toward the promontory of the sacrum, and as high over it as possible. The uterus is then let gently down into anteversion and elevated twice more, preferably with an interval of ten minutes between each.

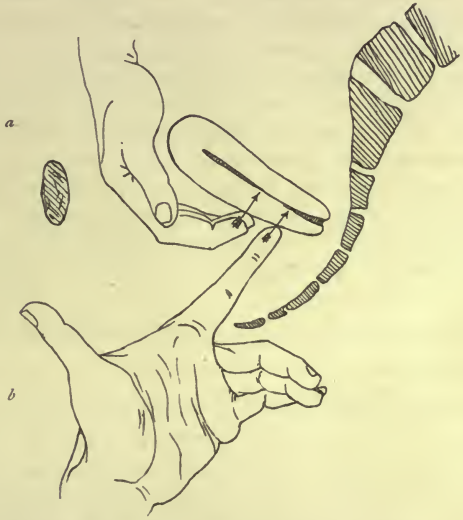

FIG. 136.—COMBINED ACTION OF THE HANDS OF THE OPERATOR AND ASSISTANT IN ELEVATING THE UTERUS.
a. Assistant's hand. *b*. Operator's hand. Both are pressing in the direction of the arrows. (*After Thuré Brandt.*)

After the last time the uterus is supported by the vaginal finger, and massaged by the abdominal hand with circular friction motions, commencing at the fundus and working down toward the cervix. Then the sacro-uterine and broad ligaments are compressed bimanually and similarly massaged. The operator begins very gently, gradually becoming more vigorous, and again becomes more gentle in finishing.

Finally the operator forcibly separates the patient's limbs while she resists and tries to close them, at the same time that she holds her hips up from the couch, and thus contracts and develops the perineal and pelvic floor muscles.

These maneuvers should be repeated daily for five or six weeks, and the patient avoid going up steps or engaging in other tiresome exercise for the first week or two, when she may gradually resume her ordinary duties.

Prolapse of the rectum is treated as follows: (1) Reduce the prolapse. (2) Begin and finish each daily seance by tapping the sacrum and such Swedish movements as force the blood through the pelvic viscera (part I, chap. V, par. 11). (3) Insinuate the fingers into the pelvis near the left anterior superior spine of the ilium with vibratory motions until the sigmoid flexure is reached, then push it up toward the umbilicus until the anus is seen to be drawn up by it. (4) Massage the rectum through the posterior vaginal wall and fornix. (5) Intermittent finger pressure on the tissues all around the anus to stimulate the sphincter. (6) The patient stands facing and leaning with the hands against a wall and contracts the sphincter ani as in holding back a stool, and repeats the exercise four or five times daily. (7) A small nutrient enema immediately after each passage of the bowels to act as a local stimulant. (8) Separate the patient's knees a few times while she resists. (9) Regulate the bowels.

12. Well-marked cases can only be cured by a combination of operations.

In most cases involving the uterus a curetting and an amputation of the cervix are indicated. Sometimes Emmet's trachelorrhaphy or Schroeder's amputation of the mucous membrane suffice, but as a rule Marckwald's modification of Simon's method is preferable (Fig. 137). The cervix is split on either side to the vaginal junction, transverse wedge-shaped portions are taken from each lip and the vaginal membrane stitched to the cervical mucous membrane before sewing up the remains of the lateral incisions. The instruments used are the same as those in other plastic operations upon the cervix.

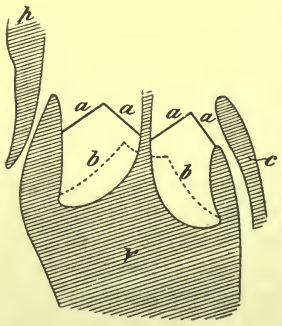

FIG. 137.—MEDIAN SECTION OF CERVIX.

Heavy lines, *a*, show the shape of incisions in Simon's method; the dotted lines, *b*, show the incision in Schroeder's method. *v*. Vagina. *c*. Bladder. *p*. Peritoneal cavity.

This is all that is usually necessary for lapsus, except such treatment as is indicated for other conditions of the uterus.

13. When there is considerable elongation of the upper portion of the cervix, the author prefers amputation by what is called *enucleation of the cervix.*

A circular incision is made about one centimeter (⅓ inch) from the margin of the cervix. Then the connective tissue is scraped from the anterior wall of the cervix for a short distance by the thumb or knife handle, in such a manner that some fibers of the cervix are scraped off, but not enough to constitute a layer. By this maneuver the blood-vessels that may chance to lie between the bladder and cervix are avoided. In the same way the connective tissue is separated a short distance on the posterior wall. Then the broad ligaments are separated laterally in such a manner that a few fibers, or an almost imperceptible layer, of cervical tissue is left attached to the ligament, and thus the uterine arteries are avoided. In order to do this the scissors not merely cut close to the cervix, but cut slightly into its lateral edge, and the thumb nail strips up the few fibers thus incised. When the thumb nail can no longer separate the superficial cervical fibers, another snip or two of the scissors enables it to again strip up a few of them. Thus both laterally and on the sides, sufficient cervical fibers are peeled off to keep clear of large vessels and to avoid tearing into the peritoneal cavity. A portion or all of the cervix or uterus can be removed in this way.

When the enucleation has proceeded high enough, the cervix is cut off, and the mucous membrane in the median line, anteriorly and posteriorly, stitched over the end of the cervix to the cervical mucous membrane, with two or three silkworm-gut sutures. The vaginal raw surfaces are

then enlarged by removing a strip two cm., or two-thirds of an inch, wide on either side, extending from the raw edges straight out along the lateral vaginal wall, for five cm., or two inches. Each side as soon as denuded is sewed up with a few deep silkworm-gut sutures that gather up the loose connective tissue, and by numerous superficial catgut sutures.

By this method, which is a modification of Kaltenbach's, the ureters, peritoneum, and blood-vessels are in no danger of being wounded, and no buried ligatures or sutures are left. The few fibers from the cervical wall that are left in the connective tissue are scarcely perceptible, and give a safe hold for the sutures in gathering up the connective tissue. Temporary forcipressure in exceptional cases is required for a few small vessels.

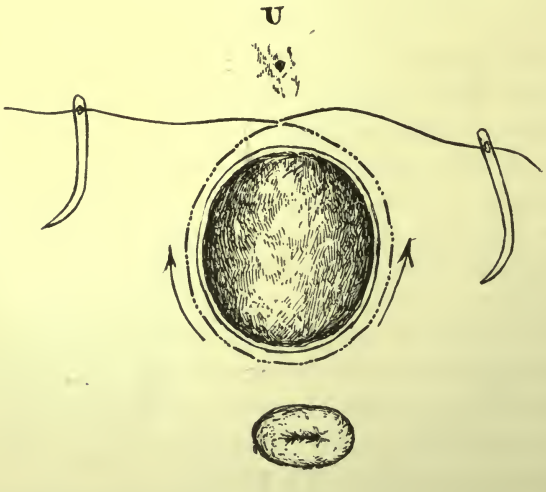

FIG. 138.—STOLTZ'S DENUDATION FOR URETHROCELE AND ANTERIOR COLPOCELE. (*Mundé.*)
U. Urethra. C. Cervix.

Instruments: Vaginal retractors, vulsella to hold the cervix, knife, scissors, tenacula, hemostatic forceps, uterine sound, needle-holder

cervix needles, silkworm-gut, medium-sized catgut, sponges, gauze, etc.

Hegar's modification of Sims' method consists in circular amputation and stitching the edges of the vaginal to those of the cervical mucous membrane in the middle, and to each other laterally.

14. *Urethrocele* and *anterior colpocele* may be remedied by Stoltz's operation. This consists in removing a circular piece of vaginal membrane from the size of a half to that of a whole silver dollar just behind the meatus urinarius. The edges of the wound are brought together by passing a silk thread of medium size in and out of the vaginal membrane all around the raw surface, like a purse string, and drawing the ends tight and tying them. The thread may be removed in two weeks.

The instruments required are a sharp knife or sharp-pointed pair of scissors, tissue forceps, a needle on a handle, a few hemostatic forceps, tenaculum, sponge-holders, perineal and vaginal retractors or Sims' speculum.

15. *Cystocele* may be cured by making an oval denudation along the anterior vaginal wall, beginning one to two cm. (half to two-thirds of an inch) behind the meatus and extending back almost to the cervix, and closing it by transverse sutures.

Lateral denudations extending along the anterior vaginal sulci draw together the connective tissue on either side, and are sometimes preferable. They may be joined by a transverse denudation under the neck of the bladder if the vagina is stretched longitudinally. The raw surfaces should in bad cases extend back as far as the cervix. (Figs. 139 and 140.)

Same instruments as in Stoltz's operation, preceding paragraph, plus small needles and needle-holder.

16. *Rectocele* alone is best treated by Emmet's perineorrhaphy (part 4, chap. 11). Extensive prolapse of the posterior vaginal wall requires that the lateral denudations be

carried farther along the posterior vaginal sulci (A. Martin), constituting posterior colporrhaphy or elytrorrhaphy (Fig. 141).

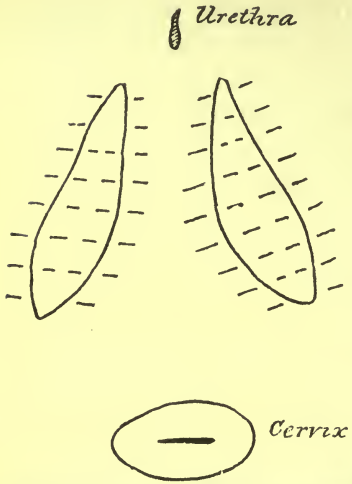

FIG. 139.—LATERAL DENUDATIONS IN THE ANTERIOR VAGINAL SULCI FOR CYSTOCELE.

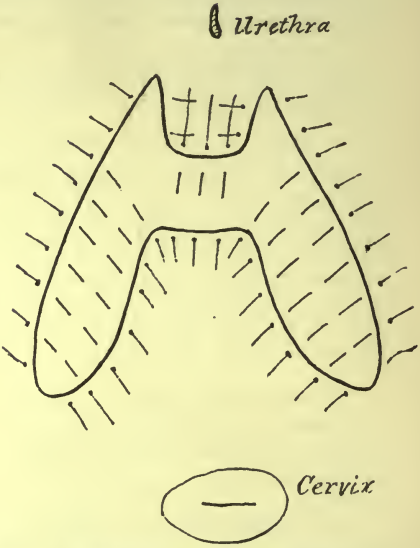

FIG. 140.—SAME AS FIG 139, JOINED BY TRANSVERSE DENUDATION.

Hegar's operation consists in denuding a large triangle extending from the vulva high up along the posterior vaginal wall. The posterior vaginal wall is thus elevated for a considerable distance, forming a barrier to keep the cervix back.

Sometimes a long lateral strip removed from each posterior vaginal sulcus, and a Tait's perineorrhaphy externally, make a good method.

Le Fort and Neugebauer denude a space on the anterior and posterior vaginal walls opposite each other and stitch them together. It is a makeshift method, but sometimes a useful one in old people.

H. W. Freund's modification of G. Bellini's method consists in passing a silver suture around the circumference of the vagina just in front of the cervix, introduced in and out of the same points in the membrane, until it emerges at the point of entrance and forms a sort of buried purse string. It is drawn tight, twisted, and cut short. An inch (two or three centimeters), or a little less, farther down another one

is introduced and treated in the same way, and so on until the vaginal entrance is reached. The sutures are to remain permanently. Silkworm-gut may also be used. An anesthetic is not always necessary.

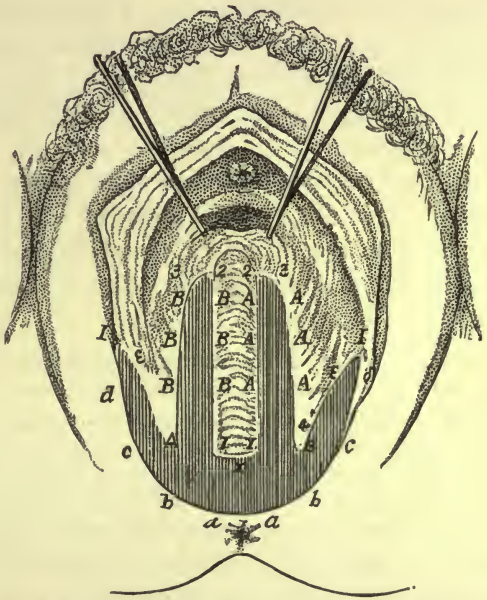

FIG. 141—A. MARTIN'S OPERATION FOR PROLAPSE.

17. *Anterior enterocele* may be cured by vaginal fixation of the uterus (chap. IV, par. 17) combined with removal of the redundancy of the anterior vaginal wall. *Posterior enterocele*, when it forms a large tumor, requires the removal of an oval piece of vaginal wall from the posterior fornix, excision of the peritoneal lining of the enlarged cul-de-sac of Douglas, and closure of the wound by deep sutures.

18. *Procidentia* can seldom be cured by plastic operations upon the lower uterine supports, for the uterus is apt to remain with its long axis in that of the vagina, ready to act as a wedge and be forced out by abdominal pressure.

Hence an operation must still be performed that will antevert the uterus.

Shortening the round ligaments, or Alexander's operation (chap. IV, par. 16), is efficient provided the vaginal operations have been well performed. The ligaments must be drawn quite tight in order that abdominal pressure will act on the posterior surface of the uterus, and thus help to hold the fundus forward.

When there are pelvic adhesions or other contraindications to Alexander's operation, or if the abdomen is to be opened for other purposes, the uterus or broad ligaments should be stitched to the abdominal walls (chap. IV, par. 18), as recommended for retroversion.

Vaginal fixation of the uterus has been performed to maintain anteflexion and is appropriate in connection with an oval denudation upon the anterior vaginal wall (chap. IV, par. 17).

It is sometimes possible to hold back the cervix by making a fold or reef in the sacro-uterine ligaments through a vaginal incision in the cul-de-sac of Douglas, or from the abdomen if it has been opened from above. The Trendelenburg position renders the latter procedure practicable.

19. In some cases of patients at or after the menopause, in which a high amputation is necessary, it is simpler and safer to remove the whole uterus, than to amputate the cervix and perform plastic operations and then one of the operations for suspension or fixation of the uterus. The vaginal bloodless method (Pratt) is preferable and may be combined with plastic operations upon the vagina.

The first steps of bloodless vaginal hysterectomy are the same as for enucleation of the cervix described in par. 10. The snipping and scraping off of superficial uterine fibers is carried to the fundus and the Fallopian tubes cut off just as they enter the uterine walls. The enucleation before and behind can be dispensed with by breaking into the peritoneal cavity where the peritoneum is reflected from the uterus to the bladder and cul-de-sac of Douglas.

The peritoneal edges, and edges of the broad ligament, are then grasped by forceps and brought down into the vaginal wound and, after the pelvic peritoneal cavity is sponged out, are united to the vaginal edges with strong catgut. The strips of vaginal wall extending laterally from the wound, as in enucleation of the cervix, are removed and the whole wound sewed up.

The instruments are the same as for enucleation of the cervix.

Operations upon the vaginal entrance may then be done according to the instructions already given (part 4, chap. II). Many times a Tait's perinorrhaphy will suffice.

CHAPTER VI.

INVERSION OF THE UTERUS.

1. Inversion, or a turning inside out, of the uterus may be merely a folding in of the fundus, or a projection of the fundus through the dilated cervix, or a complete inversion of both the uterus and cervix.

The gynecologist practically meets with but two forms, that in which the fundus projects through the cervix, and the same with prolapse.

2. **Etiology and Mechanism.** The predisposing causes are an enlarged uterus and a relaxation, or inability to contract, of a portion of the uterine walls, such as exists at the placental site in labor, and at the place of origin of a sessile intrauterine fibro-myoma. The exciting causes are pressure at or near the affected part, such as injudicious kneading of the flabby uterus with the finger during the third stage of labor, or a traction upon it from below, as occurs when the adherent placenta, or intrauterine fibroma, is drawn upon by the attendant. A short umbilical cord, labor in the standing position, and adhesion of the placenta to the fundus, are liable

to be followed by the accident. When the upper part of the uterus is thus inverted the uninverted part contracts upon it and prevents its replacement.

3. **Pathology.** Leaving out of consideration cases that are observed immediately after labor, we meet with three conditions, viz.: (1) Inversion during involution, (2) Inversion after involution, and (3) Inversion with prolapse.

When *involution has not taken place* or is not complete, the peritoneal cup or funnel formed by the depressed fundus contains all or a large portion of the uterine appendages, and may also contain loops of intestines. The inverted uterine body projects into the vagina as a large, soft, more or less spongy mass, upon which can be discovered small depressions corresponding to the origin of the Fallopian tubes. The mucous membrane is bathed in mucus which is sometimes bloody, and presents the appearance of glandular endometritis. The rim of the cervix can always be felt around the upper constricted part of the tumor, the anterior lip often being less extensively inverted and hence longer than the posterior.

Inversion after involution has neither intestines nor uterine appendages in the peritoneal cup excepting the ends of the Fallopian tubes and the ovarian ligaments. The inverted corpus is firm, pear-shaped, and hangs out of the cervix like a fibroid polypus. The mucous membrane undergoes atrophy, particularly over the fundus, and the surface resembles granulation tissue. Sometimes the glands develop more deeply than normal into the muscular tissue underneath the area of superficial atrophy. Gangrene of the uterus due to cervical constriction has been known to take place.

Inversion with prolapse is a rare condition and is the same as inversion without prolapse, except that the uterus pro-

trudes from the vulva. The mucous membrane becomes after a time covered with squamous epithelium, and may undergo ulceration from mechanical irritation.

4. **Symptoms.** Metrorrhagia, discharges of mucus, muco-pus, or bloody mucus, and the consequent anemia, are the chief symptoms. Backache, dysuria, bearing-down sensations, and, indeed, all of the symptoms of endometritis may be present. In some cases there are scarcely any symptoms.

5. **Diagnosis.** There is danger of mistaking inversion for a fibroid polypus with a large pedicle hanging from the cervix, but a careful examination dispels all doubt.

The inverted uterus is darkened and softer than a fibroid, and the sound introduced between it and the rim of the cervix finds no opening into the uterine cavity. A fibroid can be slightly twisted on its axis without twisting the cervix, which would not be the case in inversion. (Reamy.) Traction upon the uterus will sometimes temporarily invert the cervix, causing the cervical rim to disappear. The orifices of the Fallopian tubes can often be detected, and sometimes the uterine mucous membrane is sensitive.

Bimanual rectal palpation reveals the absence of the uterine body above the cervix, and also demonstrates the cup-shaped depression of the inverted fundus, with the edges of the broad ligament stretched over its lateral edges, and the ovaries lying near the rim on either side. The sound in the bladder and the finger in the rectum also detect the absence of the uterus.

6. The diagnosis of inversion with a fibroid tumor attached to the endometrium presents greater difficulty. The uterus is often perceptibly darker in color, and softer, than the tumor below it. If it is attached near the internal os the intraperitoneal funnel will not be formed all around. The

position of the entrances of the Fallopian tube will indicate the position of the fundus whenever they can be discovered on the side of the mass.

Pozzi suggests putting an elastic ligature around the upper portion of the mass in doubtful cases, and cutting into it. The capsule and appearance of the fibroid tissue in the one case, or the discovery only of normal uterine muscular wall in the other, will usually clear up the diagnosis. The incision may be sewed up, or the fibroid enucleated, before the elastic ligature is taken off.

7. **Prognosis.** In some cases a tolerance of the condition is acquired. When, however, frequent hemorrhages, anemia, and other symptoms are persistent, the patient is apt to lose ground steadily, and may die of them in the end, unless the local condition is remedied.

8. **Treatment.** Inversion during involution can sometimes be reduced by taxis. The fingers are brought together so as to construct a cone and pressed against one of the horns, or a finger is placed against one and the thumb against the opposite horn (Noegerrath), while the other hand exerts counterpressure over the abdomen against the cervical rim; or the hand grasps the fundus and alternately compresses the fundus and stretches the cervix (Emmet). Such maneuvers will usually succeed only in very recent cases. When the uterus is swelled from hyperemia it may be superficially incised to relieve the hyperemia and the cervix also incised in several places to relieve the pressure. Efforts at reduction are then more successful, although not without danger of extensive laceration of the cervix (Barnes).

Courty recommended to pass two fingers into the rectum and over the cervical rim for counterpressure. Tate, of Cincinnati, introduced the index fingers into the rectum and bladder respectively, and the thumbs into the vagina, and effected reduction in a case.

Various appliances have been devised for the purpose of using firm pressure during attempts at forcible reduction. These consist either of a thick drumstick or a rod with egg-shaped or cup-shaped extremities. The cervix is sometimes held down by vulsella that catch in opposite sides of the cervix. All kinds of manipulation per vaginam, per rectum, per urethram, and from the abdominal walls have been employed, but without encouraging success.

T. Gaillard Thomas, and others following him, have opened the abdomen, dilated the funnel with dilators, and pressed the fundus up in place from the vagina.

9. The *gradual methods* are almost always to be preferred. The one most often recommended is to pack the vagina with strips of iodoform gauze two inches (or five cm.) wide, in such a manner that the fundus will be pressed upward in the direction of the axis of the superior strait, and the vagina be sufficiently stretched to make traction upon the cervix. The uterus is pushed into the vagina until the long axis approximates that of the superior strait, and then forced up as far as the vaginal walls will permit, and held there by the strips of gauze packed around and under the uterus. The patient should be kept in bed, and means be taken to secure regular evacuations of the bladder and rectum. The gauze should be removed every second day, the vagina douched out with a 1–2000 solution of corrosive mercuric chlorid, followed by a plain sterilized douche, and then be carefully repacked. From a

FIG. 142.—POSITION OF RUBBER BAG IN THE REDUCTION OF INVERSION.

few days to two weeks are required for the complete reduction.

The rubber bag or colpeurynter has often been used to effect reduction. (Tyler Smith.) The axis of the uterus is made to correspond with that of the superior strait, the empty bag introduced under it and inflated with air and water. It is removed every twenty-four or forty-eight hours, and after disinfection of the bag, and also of the vagina, is reintroduced. The patient remains in bed.

10. As a last resort an elastic ligature may be put around the cervix, the uterine body amputated, and ligatures be placed obliquely through the edges of the stump to unite the peritoneal edges and prevent hemorrhage. (Kaltenbach.)

It is a question whether it is not advisable for the experienced surgeon to perform vaginal hysterectomy rather than amputation.

CHAPTER VII.

DISPLACEMENTS OF THE OVARY. HERNIA OF THE OVARY.

1. The ordinary *displacements* of the ovary are downward on the posterior surface of the broad ligament and in the recto-uterine pouch. The organ may be fixed by peritoneal adhesions, or it may be enlarged and movable and connected with a relaxed condition of the peritoneum. The fimbriated end of the tube usually accompanies it. Its weight is sometimes sufficient to retrovert the poorly-supported uterus, or, on the other hand, the retroverted uterus may drag back the normal-sized ovary.

2. The **causes** are oophoritis, the occurrence and absorp-

tion or contraction of pelvic effusions and exudates, retroversion of the uterus, subinvolution, and general relaxation of the pelvic tissues due to emaciation and debility. The congestion and relaxation induced by excessive coitus extending over a long period of time may cause it.

3. The **symptoms** are moderate, fixed pain in the iliac region radiating upward or downward, nausea and dragging sensations in the pelvis. If there be adhesions the symptoms of oophoritis, pain in the back, gluteal and sciatic regions, backache, painful defecation, dysmenorrhea, and dyspareunia may be present.

4. The **diagnosis** depends upon finding the tender ovary by the vaginal or rectal touch, either behind the cervix or at one side, and tracing its connection with the uterine horn. Pressure upon it causes pain in the iliac region and sometimes nausea or, if there be adhesions, pain in the back.

Fecal masses in the rectum are differentiated in being mashed by the vaginal finger or directly palpated per rectum. They are less easily moved than the non-adherent, and more movable than the adherent, ovary.

5. **Treatment.**—Replacement of the retroverted uterus usually draws up the ovary when there are no adhesions. If the uterus is in a normal position, vaginal tamponade in the knee-chest position, faradism of the pelvic tissues, pelvic massage (part 1, chap. v, par. 8, 9, 10), cold vaginal or rectal douches, out-of-door exercise, tonics, laxatives, and a Thomas retroflexion pessary may cure the displacement, or at least relieve the symptoms.

When the ovaries are adherent, hot vaginal douches, and glycerin and ichthyol tampons are indicated for tenderness. Later pelvic massage may succeed in stretching or breaking up the adhesions to the extent of relieving pain. (Thuré Brandt.) In some cases the adhesions may be forcibly

severed (Schultze) by the recto-vaginal bimanual manipulation, under anesthesia (chap. IV, par. 9).

In the worst cases one or both ovaries may be removed (part 6, chap. XI, par. 10 and 11).

6. **Hernia of the Ovary,** which is a rare affection, may be congenital or acquired.

Congenital hernia is always inguinal, and may be due to an imperfect development of the round ligament, or to a patency of the canal of Nuck. Two-thirds of inguinal ovarian hernias are congenital. (Puech.)

Symptoms do not usually appear until the time of puberty, the principal ones being tenderness and increase in size of the inguinal mass during menstruation. Occasionally the return circulation is interfered with, and symptoms of ovaritis develop.

The *diagnosis* is made by the sickening sensation produced upon pressure, the correspondence in shape of the protruding mass to that of a normal or enlarged ovary, the absence of the ovary from the pelvis as demonstrated by bimanual palpation, the dislocation of the corresponding uterine horn toward the inguinal ring, and the movement of the inguinal mass when the fundus is pushed toward the other side of the pelvis.

The palliative *treatment* consists in protection by a hollow covering held in place by elastic bands around the waist and inner surface of the thigh, until reduction can be effected.

If taxis will not bring about reduction, herniotomy with incision of the external ring and dilatation of the canal should be tried. Abdominal section, with traction from within the peritoneal cavity, and pressure from without has effected cures in a few cases. If all means fail the ovary may be removed—although this is seldom necessary.

7. *Acquired hernia* of the ovary may exist in the inguinal, crural, ischiatic, and obturator regions. It is usually the result of pregnancy and childbirth in women who have previously had a hernia. As a rule, it is accompanied by, and adherent to, the omentum or even the intestine, and is then difficult of recognition. The diagnosis and treatment are the same as for ordinary hernias.

PART SIX.

INFLAMMATORY LESIONS.

CHAPTER I.

INFLAMMATION OF THE VULVA.

VULVITIS, LABIAL ABSCESS.

1. Vulvitis may be divided into the simple, gonorrheal, follicular, and phlegmonous varieties. Gonorrheal vulvitis will be considered in connection with gonorrheal vaginitis.

2. In **Simple Vulvitis** hyperemia and infiltration of the superficial tissues may affect the entire vulva, or may be confined to the parts just external to the hymen. More or less exfoliation of epithelium takes place and patches of erosion or even ulceration may appear.

The discharge is usually mucoid or muco-purulent, and may be abundant or scanty. In the latter case it is apt to become sticky in character, and in children often causes adhesion of the labia.

When the discharge is purulent, staphylococci or streptococci are found in the secretion, but in many cases, particularly in those affecting young children, the saprophytic germs, and others whose characteristics are not so well understood, seem to be the dominant ones.

A tendency to spread to the urethra, vagina, and vulvo-vaginal gland is characteristic of cases with purulent discharge.

The disease may commence suddenly as an acute inflammation, or the onset may be gradual.

3. The *causes* are,

(*a*) *Irritating or septic discharges*, such as are present in septic endometritis, ulceration of the cervix, carcinoma, vaginitis, pelvic abscess, urinary fistula, etc. Diabetic or decomposed urine, and septic urethral discharges, are occasional causes.

(*b*) *Irritants from external sources*, such as dirt, pinworms, chemicals, skin eruptions, etc.

(*c*) *Traumatism*, such as falls, blows, brutal attempts at coitus, rape, masturbation, friction in fleshy people, etc.

4. The *symptoms* are itching, heat, and burning sensations in the parts, increased during walking or in urinating. The vulva is somewhat swollen, tender to the touch, reddened on the inner surfaces, and usually bathed with mucopus.

In cases connected with irritating discharges pruritus is apt to be present, and may be out of all proportion to the amount of apparent inflammation.

5. The *treatment* should first be directed to the removal of the cause (par. 3).

Copious vaginal douches of 1–4000 corrosive mercuric chlorid or one per cent. carbolic acid every six or eight hours, hot alkaline sitz baths twice daily, and the constant application between the labia of cloths wrung out in 1–200 to 1–500 solutions of acetate of lead or carbolic acid may be employed. After the acute symptoms have subsided five per cent. carbolized oxid of zinc ointment protects the parts, relieves itching, and benefits the inflammation. (See *Pruritus*, part 3, chap. VIII.)

6. **Follicular Vulvitis** is an inflammation localized in the sebaceous, piliferous, and mucous glands. They are dis-

tended with their natural secretion or pus, and form small projections upon the labia and prepuce from the size of a white clover seed to that of a small split pea. When the inflammation is situated in the inner aspect of the vulva, the glands do not always form visible projections. An offensive mucous discharge is in such cases usually found on the surface.

The *causes* are similar to those of simple vulvitis, infection from vaginal discharges being perhaps the most frequent.

The *symptoms* are also the same as those of simple vulvitis. Intense itching is apt to be present when the disease affects the inner surfaces of the labia.

7. The *treatment*, in addition to that of simple vulvitis, requires strong antiseptics, such as 1–2000 corrosive chlorid of mercury. Alkaline lotions assist in dissolving out the secretions. When practicable, the follicles should be squeezed out, with or without previous puncture, and destroyed by a ten per cent. solution of silver nitrate, by the tincture of iodin, or by galvano-puncture.

8. **Phlegmonous Vulvitis** possesses the same characteristics as abscess formation elsewhere, and should be similarly treated. On account of the tendency of the pus to spread, an early evacuation is indicated. In chronic cases it may become necessary to excise the cicatricial tissue and unite the raw surfaces by deep sutures.

CHAPTER II.

INFLAMMATION OF THE VULVO-VAGINAL GLAND, KRAUROSIS, NOMA.

1. **Inflammation of the Vulvo-vaginal Gland.** The vulvo-vaginal, or Bartholin's, gland may become infected by the discharges of vulvitis or vaginitis, particularly of the gonorrheal variety. If the duct is not closed the secretion, which is as a rule purulent in the beginning, may, as the inflammation subsides, become mucous in character. In many cases the duct becomes occluded and an accumulation of mucus (cyst formation) or of pus (so-called abscess) occurs either superficially in the duct or more deeply in the gland proper.

2. The *symptoms* are tenderness and slight tumefaction of one or both labia, and a mucous or muco-purulent discharge that can sometimes be pressed out of the reddened orifice.

If the duct is occluded there is a permanent or intermittent distention of the gland or its duct, producing a round, elastic, tender tumor in the middle and lower portion of the labium, from the size of a hazelnut to that of a large walnut. If it is large or contains pus it may cause great distress, and prove an obstacle to coitus, or even confine the patient to bed.

Sometimes the mucus or pus can be pressed out through the orifice, at other times, after a certain amount of painful distention, the gland empties itself. When pus is present, ulceration and rupture on the inner side of the labium may take place, followed by contraction of the opening and a repetition of the phenomena.

3. The *treatment* of the milder cases consists in alkaline sitz baths, hot alkaline fomentations, and evacuation of the gland by pressure performed by the patient several times daily. Antiseptic vulvar washes are also of benefit.

FIG. 143.—DISTENTION OF THE RIGHT VULVO-VAGINAL GLAND WITH PUS.

When the duct is cystic an attempt may be made to dilate it with a fine probe. If this fails, and evacuation does not occur within a few days, the mucus may be drawn off by a hypodermic syringe, and tincture of iodin or five per cent. carbolic acid in alcohol be injected. If this

does not help, the gland should be excised and the wound, after thorough disinfection with 1–2000 corrosive chlorid, be closed by deep sutures. Incision and packing is not to be recommended, as it is followed by prolonged suppuration. When, however, the duct alone is cystic, incision and antiseptic applications may be tried.

When the contents of the cyst are purulent the pus may be evacuated by incision in order to afford relief, but the gland should afterward be removed as recommended above. Primary union after removal, and thus an immediate cure, can nearly always be obtained if an antiseptic technic be adhered to. Pregnancy constitutes an indication rather than a contraindication to excision.

4. **Kraurosis Vulvæ** is characterized by an atrophy of the mucous membrane and skin of the vulva. (Tait, Breisky.) It commences on or about the labia minora as small red spots or streaks of dilated capillaries, which spread in curves, or disappear in one part to reappear in another. As the disease advances the membrane becomes pale and shrinks, often obliterating the nymphæ and almost closing the vulva. The change has been likened to premature or advanced senile atrophy.

In the beginning there is a hypertrophy of the epithelial covering and a dilatation of the capillaries at the site of the red spots, later a thinning of the rête mucosum. The sudoriferous and sebaceous glands disappear, and the papillæ grow smaller.

5. The *cause* is unknown. It is probably due to some specific germ.

6. The *symptoms* are often noticeable by their absence. Pruritus is one of the most frequent. Pain with tendency of the parts to crack and bleed upon coitus or digital examination are the most characteristic. Labor usually

produces extensive superficial lesions. There may be a slight yellowish discharge, but ordinarily the surface is dry, smooth, and pale in the advanced stages. The progress of the disease is a slow one.

7. The *treatment* is unsatisfactory, as nothing seems to check its progress. Strong carbolic acid seems to afford some relief. Excision of the affected parts and sewing together the raw edges seems to have given the best results. Curetting and cautery of the diseased surfaces have also been used with much benefit.

8. **Noma, or Gangrene of the Vulva,** is an exceedingly fatal disease of infectious nature, and occurs as a rule in children living in unhealthy surroundings. The first signs are redness and infiltration of one of the labia and an ichorous discharge. Soon a vesicle appears on the surface which assumes a grayish-green color and rapidly becomes gangrenous. The vital powers fail rapidly.

When seen before extensive infiltration has occurred, the affected parts should be promptly excised, and if the wound is too large to be sutured it should be disinfected every three or four hours by an efficient antiseptic, such as five per cent. carbolic acid, and be kept covered with cloths moistened in a weaker antiseptic solution, such as one per cent. carbolic acid, 1–3000 potassium permanganate, or 1–5000 mercuric corrosive chlorid, changing the ingredients of the application occasionally to prevent poisoning by absorption. Alcoholics, strychnia, digitalis, and concentrated nourishment should be given and pushed to the point of tolerance.

CHAPTER III.

VAGINITIS.

1. Vaginitis, may be divided into the following varieties: simple, gonorrheal, granular, adhesive, cystic, and aphthous.

2. **Pathology.** In the acute stage of *simple vaginitis* there are hyperemia and enlargement of the papillæ, and small-celled infiltration of the epithelial structure. The epithelium of the tops of the papillæ is shed, but is thickened between them. The secretion in some cases is thin and slightly acid, in others it becomes alkaline and thick, in others purulent. Epithelial cells, leucocytes, saprophytes, various unknown germs, and sometimes the streptococci and staphylococci are found in it. In the chronic form the deeper layers of the membrane become infiltrated, and the epithelium may be entirely lost in places, giving rise to ulcerations.

3. In the *gonorrheal* variety the changes are similar to those mentioned above, but more pronounced. The papillæ are larger and more vascular, yet in some cases the infiltration about them diminishes their projection and may even cause them to disappear from view. The inner surfaces of the labia and vestibule participate in these changes. The secretion is at first muco-purulent and creamy, but gradually becomes thinner and more distinctly purulent. It contains gonococci (Neisser).

Infection of the urethra, vulva, and vulvo-vaginal gland is apt to occur.

4. *Granular vaginitis* differs anatomically from the above forms chiefly by the more pronounced enlargement of the papillæ and more extensive exfoliation of the epithelium on

them, causing the surface to resemble a mass of granulations.

5. *In adhesive vaginitis* the affected surface is smooth, and the inflammation may be general or may vary in degree in different portions. Ecchymotic spots are sometimes found. The papillæ are small but infiltrated with round cells, and sometimes denuded of epithelium. The secretion is thin and scanty. The apposed surfaces tend to stick together and thus obliterate the lumen of the fornices or even of the whole vagina. It is a disease of old people and children, and is supposed to be connected with an imperfect state of nutrition of the parts.

6. *Follicular vaginitis* consists of an inflammation in the follicles that are occasionally situated about the vaginal fornices. The contents are often retained and give rise to small cysts containing mucus.

7. *Aphthous vaginitis* consists of a development of the *Oidium albicans* on the congested and more or less eroded vaginal surface. The vaginal portion of the cervix and the vulva may be likewise affected. Whitish patches of the deposit are found on the surface.

Vesication of the vagina sometimes takes place as the result of local irritation, more particularly chemical irritation, and has given rise to the name *vesicular vaginitis.*

The so-called *emphysematous vaginitis*, in which a development of gas is supposed to take place in small spaces and canals in the connective tissue and lymphatics, might, I think, be accounted for by a gaseous decomposition taking place in inflamed follicles, with passage of the gas through the cyst walls into the connective tissue. Pregnancy favors the development of this condition.

8. **Etiology.** The thick epithelial covering of the vagina renders it less liable to infection than either the vulva, urethra, or cervix.

(*a*) Local irritation with immediate or subsequent infection

causes many cases. Thus pessaries, tampons, or other foreign bodies retained for a length of time, chemical irritants, traumatism, masturbation, and pin-worms may produce lesions that become infected from germs present in the vagina. The urine in cases of vesico-vaginal fistula may be the source of irritation. Secretions retained about foreign bodies, or by obstruction at the outlet, may undergo septic changes and become the source of irritation.

(*b*) Direct infection by gonorrheal virus during coitus, or by septic uterine discharges from septic metritis, cancer, etc., is a prolific source.

(*c*) Extension of a septic or gonorrheal urethritis, vulvitis, or cervicitis accounts for many cases.

(*d*) General conditions, such as pregnancy, tumors obstructing the pelvic circulation, chlorosis, anemia, etc., predispose to it or, if it is already present, aggravate it. The exanthemata are said to cause it.

9. **Symptoms.** Acute vaginitis is ushered in with sensations of heat and heaviness in the vagina and a slight rise of temperature. Vulvar itching, a frequent desire to urinate, backache, nausea, nervous irritability, and a feeling of malaise are common symptoms. There is local tenderness, dyspareunia, and, if the menses appear, menorrhagia. The discharge, at first scanty, rapidly increases in amount and sometimes has a disagreeable odor.

10. The symptoms of chronic vaginitis are similar in character but less pronounced. In some cases they are absent altogether, and nothing but a leucorrheal discharge (the whites) calls the patient's attention to the condition. In some cases the general health becomes impaired, and even hysteria may be present.

11. The **Diagnosis** is based upon the local tenderness, redness, and the appearances and the discharges already

described in the pathology. When the discharge is abundant, the cervix, as a rule, furnishes a portion of it, particularly if it is slimy in character (chap. VII, par. 6). In chronic cases, the cervix should be examined through a speculum.

12. The **Prognosis** is ordinarily good if the case is treated early. In chronic cases, particularly if the cause cannot be removed, a cure may be difficult or impossible. In the septic forms the tendency to spread to the urethra, vulvo-vaginal glands, and uterus renders the prognosis less favorable.

13. **Treatment.** In *acute vaginitis* the general treatment consists in quietude, saline laxatives, and a restricted diet.

The local treatment has for its main object the removal of the septic discharge which keeps up and spreads the infection. Warm alkaline sitz baths two or three times a day are beneficial. In gonorrheal and bad forms of puerperal inflammation, copious vaginal douches of a saturated solution of boracic acid in hot water, lasting from fifteen to twenty minutes, should be taken in the recumbent position every hour or two in the daytime, and every four hours during the night. As soon as the soreness has subsided antiseptic douches such as 1–4000 corrosive mercuric chlorid, or permanganate of potassium, or one per cent. carbolic acid, or creolin, should be used every three hours, and be continued for at least two weeks. After the first two weeks douches double this strength should be employed four times daily.

Urethral, vulvo-vaginal, and cervical discharges should receive attention to prevent reinfection.

When the vaginal douches are taken too far apart during the acute stage, they do more harm than good, since they do not arrest the progress of the infection and are liable to carry it to the cervix.

After a speculum can be tolerated by the vagina, the dry treat-

ment may be used. The vagina is thoroughly douched out as recommended above, the speculum introduced, the cervix and vagina wiped out with a 1–2000 solution of mercuric corrosive chlorid, and the vagina loosely packed with dry borated or iodoform cotton. This treatment should be repeated every eight hours, until the secretion is pretty well checked, then twice daily. A dry absorbent dressing should be worn between the labia and changed every two hours.

14. In *chronic vaginitis* the stronger solutions recommended in par. 13, and also astringent solutions, are used, such as one per cent. acetate of lead, sulphate of zinc, or alum, or 1–2000 potass. permang. In old cases a two per cent. solution of silver nitrate or the undiluted tincture of iron may be applied through a speculum. Tampons squeezed out of these solutions may in some cases be left in the vagina for several hours, once every two or three days. Powders of equal parts of tannin and iodoform, or of subnitrate of bismuth and chalk, kept in the vagina by cotton tampons and changed once a day, act well.

The condition of the general system should always receive attention.

15. *Adhesive vaginitis* should be treated by douches of saturated solution boracic acid or 0.5 per cent. solution of acetate of lead. Tampons or strips of lint soaked in a five per cent. solution of carbolic acid in glycerin or smeared with oxid of zinc ointment are kept in the vagina between douches. Suppositories containing five per cent. each of iodoform and tannin, or ten per cent. of oxid of zinc, or two per cent. of acetate of lead, are more convenient and are often efficacious.

16. *Aphthous vaginitis* requires antiseptic douches, packing with powdered borax, or iodoform and tannin, or vaginal tamponade with a 50 per cent. solution of boroglycerid in glycerin.

CHAPTER IV.

URETHRITIS.

1. The urethra is subject to all grades of inflammation, as are other mucous membranes, and presents the same pathological alterations of structure, such as hyperemia, acute catarrhal urethritis, chronic interstitial urethritis, granular urethritis, follicular urethritis, ulceration, and a sacculated condition.

2. *Simple hyperemia* when passive depends upon an injury to the integrity of the parts, as occurs in labor, or upon interference with the circulation from uterine displacement, varicose veins of the pelvis, etc. An intermitting active hyperemia sometimes exists in connection with an irritating quality of the urine, excessive coitus, etc. A certain amount of infiltration of the mucous membrane usually exists in cases of long standing, and constitutes in reality a mild form of urethritis.

3. *Acute catarrhal urethritis* is usually met with in a septic form, the result of infection from gonorrheal or other kinds of pus. Round-celled infiltration takes place and in the severe cases, or those which last for some time, the deeper tissues are affected, and chronic interstitial inflammation, with thickening of the mucous membrane and encroachment upon the lumen of the urethra, results. As the infiltrate becomes organized there is a permanent narrowing of the urethra, or stricture.

Stricture in women is usually a narrowing of a large portion or the whole of the urethra, and is seldom small and circumscribed, as in men.

4. When hyperemia or moderate inflammation has

existed for a long time, or has been repeatedly excited, the papillæ become hypertrophied and covered with young, imperfectly developed epithelium. This condition is called *granular erosion.*

5. *Follicular inflammation* is located in the mucous follicles about the urethral orifice. The principal follicles are Skene's glands, near the floor of the urethra, which extend upon each side, from the meatus upward about half an inch (1.5 cm.) or a little farther. These, as well as the smaller glands or follicles, may discharge mucus or pus, and be surrounded with inflammatory products that cause a hyperplasia of the mucous membrane and sometimes closure of their orifices. Unless vigorously treated the condition is liable to last indefinitely. It may exist without participation of the upper portion of the urethra, although in many cases a general urethritis has existed and subsided.

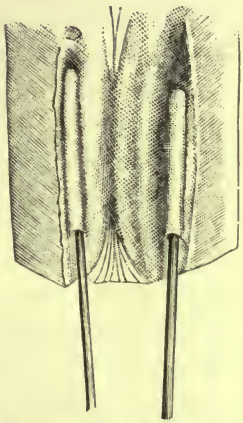

FIG. 144.—URETHRA LAID OPEN WITH PROBES DISTENDING SKENE'S GLANDS (POSTERIOR WALL DIVIDED). (*Skene.*)

6. *Ulceration* may result when inflammatory conditions are aggravated by traumatism, such as the passage of calculi, frequent or awkward use of the catheter, etc., or by specific infection, such as the diphtheritic or venereal.

7. As a result of the passage of a calculus, or injury during labor, a laceration or overdistention of the middle portion of the urethra and some contraction of the meatus take place, giving rise to retention of a small quantity of urine and urethral secretion. The retained fluid undergoes decomposition and perpetuates the inflammation.

8. **The Symptoms and Course.** The symptoms of hyperemia are frequent urination, a slight burning sensation during micturition, and some discomfort or even pain in the urethra, particularly after coitus, active exercise, the ingestion of acids, stimulants, etc. The mucous membrane is deeper red than natural.

9. *Gonorrheal urethritis* begins with an itching sensation in the urethra, followed in a few hours by scalding during the passage of urine and a frequent desire to urinate. Vulvitis usually precedes or accompanies it. Upon examination a drop of thick muco-pus can be pressed out of the swollen meatus. The discharge is at first mucoid, but rapidly becomes purulent, and unless treated continues so for two or three weeks, and then gradually disappears. The symptoms subside before the discharge disappears, but are apt to reappear occasionally, even after the discharge has disappeared.

Septic urethritis caused by purulent vaginal discharges begins in a gradual manner, produces a purulent discharge which may be less abundant than the gonorrheal, but on account of the continuance of the infection is apt to continue longer and cause more suffering. Catheterization is liable to carry the infection into the bladder.

The tenesmus or desire to urinate due to urethritis must not be confounded with that of cystitis. That of urethritis can be restrained, is attended by scalding, and is relieved by the passage of the urine. That of cystitis is uncontrollable, not attended by burning, and is not relieved by urinating. The tenesmus continues for a while afterward.

10. The symptoms of *chronic interstitial urethritis* are a more than normally frequent passage of urine, and sometimes temporary inability to pass it on account of a stricture with spasm. Mild symptoms of acute urethritis are liable

to follow coitus, prolonged exertion, etc. The fingers placed in the vaginal entrance can in some cases feel a decided thickening of the urethra. A small sound can usually be passed without difficulty or pain, but a large one encounters firm resistance and causes severe pain.

11. *Granular erosion* produces great suffering during the passage of urine with distressing tenesmus. It is a persistent chronic disease, and affects old multiparæ more than young women. The meatus is large, deep-red, and granular in appearance, and sensitive to pressure. The urethra readily allows of the passage of a normal-sized sound, although not without some pain.

The symptoms of *ulceration* are similar to those of granular erosion, but are variable in severity. A drop or two of blood is sometimes found at the meatus or on the patient's linen. Pressure on the urethra will find thickening and sensitiveness over some part of the canal, and the sound will usually find a spot of painful resistance within the urethra.

12. The symptoms of *follicular urethritis* are great tenderness about the meatus, discomfort in sitting and walking, stinging pain, and a continual sense of heat in the parts. (Skene.) Pain and frequent micturition are present in some cases.

The meatus looks red, puffy, and more or less everted, with projecting folds of hyperplastic mucous membrane simulating caruncle. Small areas of erosion are often found on the inner surfaces of the labia minora and under the posterior edges of the meatus, due to the irritation of the discharges. Small red spots, or areolæ, usually indicate the orifices of the inflamed follicles. Pressure upon the urethra under the subpubic ligament sometimes forces out a little of the discharge.

13. The sacculated urethra presents the ordinary symp-

toms of urethritis, with marked enlargement, smoothness, and great tenderness of the urethral ridge under the pubic arch. The catheter evacuates a little turbid, more or less offensive urine as soon as it passes the meatus, and its point can be moved about freely in the dilated portion.

14. **Treatment.** *Simple hyperemia* usually subsides upon a removal of the cause. Warm sitz baths, hot vaginal douches, and the internal administration of buchu, and uva ursi sometimes act beneficially. The passage of a sound (No. 12 or 14, American scale) twice weekly, and the local application of astringents, such as the tincture of iron, after the sound is withdrawn, by means of an applicator, or the injection of an emulsion of bismuth once daily (Skene), or the use of a mild bipolar faradic current once daily, may be tried in persistent cases.

15. In *gonorrheal urethritis* internal remedies and injections should be used as for gonorrhea in the male. A large proportion of the chronic cases of urethritis in women are due to a neglect of such local treatment. A vaginal douche should precede each local treatment.

16. *Chronic interstitial urethritis* and *stricture* should be treated by dilatation of the urethra with the sound twice weekly, followed each time by a local application of tincture of iron. About once in ten days strong carbolic acid may be substituted. When these applications increase the symptoms they should be less frequently used or be omitted for a time, but the sound should still be used.

Granular urethritis may be treated in the same way. The stronger solutions, such as strong carbolic acid or ten per cent. solution of silver nitrate or zinc chlorid, act best.

Chronic ulceration should be treated by dilatation and the application of the above-mentioned solutions of silver and zinc, or even stronger ones, to the ulcer by means of a

urethral speculum. In recent cases the ordinary treatment for urethritis may suffice.

17. *Follicular urethritis* should be treated by puncture or incision of the mouths of the follicles and the application to them of the tincture of iodin, or of 95 per cent. carbolid acid. Skene's glands, if affected, should, after dilatation of the urethra, be slit open their entire length. Large folds of mucous membrane projecting at the meatus should be anesthetized with cocain and snipped off with scissors, or burnt off with nitric acid. Cautery by electro-puncture may also be used for obliteration of small follicles.

FIG. 145.—JACKSON'S URETHRAL SPECULUM.

18. The urethritis accompanying the sacculated urethra can sometimes be cured by dilating the meatus, washing out the urethra, and applying a strong astringent, such as the tincture of iron, two or three times weekly. After the inflammation is cured, an oval or triangular strip of vaginal mucous membrane may be excised from under the urethra and the edges drawn together, and thus the caliber of the canal be narrowed.

In obstinate cases Emmet's button-hole operation is required to drain the sac. A sound is introduced and cut down upon in the median line. The incision should commence about half an inch (1.5 cm.) beyond the meatus and extend about half an inch up the canal. The mucous edges of the urethra and vagina should be stitched together with fine silkworm gut. It can be closed when the inflammation is cured in the same way as an artificial vesico-vaginal fistula.

CHAPTER V.

CYSTITIS.

1. All grades of cystitis are met with, from simple hyperemia to the fully developed parenchymatous, ulcerative, and gangrenous. As special forms may be mentioned exfoliative, croupous, and diphtheritic.

2. **Pathological Anatomy.**—*Hyperemia* in the beginning consists of a temporary dilation of the capillaries and arterioles. Repeated or long-continued hyperemia causes permanent dilatation of these vessels, particularly of the venous radicles, and even varicoses. Intense hyperemia may lead to ecchymoses in the mucous membrane or hemorrhage into the bladder. The effused blood may immediately pass off with the urine, or form coagula, or remain for some time and assume a coffee-ground appearance. If the hyperemia persists, some hypersecretion and infiltration of the bladder walls eventually result, constituting a *spurious cystitis.*

3. In *acute cystitis* there is hyperemia, followed in a few days by shedding of the epithelium of the folds of the mucous membrane, and the appearance of a muco-purulent fluid between them. The bladder walls are somewhat contracted. Ecchymosis is not infrequently found in patches.

In *chronic cystitis* the hyperemia is worse in places and the mucous membrane is covered with thick mucus or muco-pus. The submucous, muscular, and sometimes the serous coats are congested and infiltrated (parenchymatous cystitis), and ulceration and even destruction of portions of the muscular layers may take place, particularly in the

croupous and diphtheritic varieties. The urine sometimes undergoes decomposition in the bladder.

Gangrene may occur in severe attacks of acute cystitis supervening upon chronic inflammation. The mucous and submucous tissues become softened, dark in color, disintegrated, and fall off in shreds. The bladder is apt to become distended and contains the decomposing urine, blood, pus, and tissue-débris. Extreme distention from prolonged retention of urine during labor (Skene) may cause exfoliation of the entire mucous membrane (exfoliative cystitis).

Severe and neglected forms of cystitis frequently spread to the ureters and kidney. Peritoneal adhesions may exist.

4. **Etiology.** The causes of *hyperemia* and *spurious cystitis* are inflammation or congestion of the surrounding organs, catching cold, falls or bruises, pressure of tumors, traction by the displaced uterus, holding the urine too long, and irritating qualities of the urine from the use of stimulants or improper food, etc.

The causes of *cystitis* are the various forms of infection, such as gonorrheal, ordinary purulent, diphtheritic, etc. There may be an extension of inflammation from the urethra or ureter, or direct infection by foreign bodies introduced, such as hairpins, catheters, etc. Habitual imperfect evacuations of the urine in connection with displacement, and hyperemia of the parts, are apt to result in chronic cystitis.

5. **Symptoms.** The symptoms of *hyperemia* and *spurious cystitis* are frequent painless urination, with tenderness over the bladder, and sensations of heat and weight about the pubes, which are increased by standing or walking. But a small amount of urine is evacuated each time, and is followed by a desire to pass more.

The urine may be normal, but if the attack lasts for a

few days it contains more mucous than is normal, some blood globules, and an increase of epithelial cells. There is but little constitutional disturbance.

6. The symptoms of *catarrhal cystitis* are a frequent uncontrollable desire to urinate, with painful bearing down sensations, after the bladder is evacuated. But little urine is passed each time, and no relief is obtained. Pains radiate from the bladder down the urethra and up through the abdomen, and are worse when the patient sits or stands.

There may be considerable febrile reaction, although in chronic cases there is often but little systemic disturbance of any kind.

The urine contains considerable mucus and more or less pus, blood globules, epithelial cells, and urinary sediment. In chronic cases it is frequently ammoniacal.

In gangrenous, exfoliative, croupous, and diphtheritic cystitis retention of urine may be caused by the blocking of the neck of the bladder with the shreds of tissue or membrane. In such cases the general symptoms are such as belong to septic conditions.

An endoscopic examination reveals the redness and swelling of the bladder wall, or the ulcerated spots and denuded muscular tissue.

7. **Diagnosis.** The diagnosis of cystitis can be made from the character of the pain, and in septic cases by the presence of pus and blood or tissue debris in the urine. A septic vaginal discharge or gonorrheal urethritis may indicate the nature of the inflammation. In chronic cases, the upper urethra and neck of the bladder should be examined by the speculum or endoscope for the purpose of discovering an ulcer or fissure that might occasion the symptoms.

The specific gravity is low in chronic cases, usually about 1010. The microscope reveals pus corpuscles,

spheres of urate of ammonia, triple and amorphous phosphates, and organic debris. Albumin is found by the chemical tests out of proportion to the amount of pus and blood in the urine.

8. **Prognosis.** In hyperemia and acute cystitis the prognosis, with appropriate treatment, is good. Chronic cystitis, with ulceration, or adhesions to the neighboring organs, is difficult of cure, yet seldom incurable. Gangrenous, exfoliative, croupous, and diphtheritic cystitis give a mortality of 45 per cent. (Winckel.)

9. **Treatment.** In *hyperemia* and *spurious cystitis* coming on suddenly the patient should take a sitz bath at a temperature of about 100° F., go to bed, and apply hot fomentations over the lower abdomen. If the tongue is coated or the urine dark colored, eight grains, or half a gram, of pilulæ hydrargyri should be given, followed in six or eight hours by a saline laxative; if the tongue is clean the mercury may be omitted. The skin should be kept active by warm covering, but excessive sweating is to be avoided. A full dose of opium or of morphin with gr. ¼ (0.015 gm.) of extract of belladonna, or of gr. $\frac{1}{60}$ (0.001 gm.) of atropin may be given at bedtime.

In mild cases a teaspoonful every three hours of a mixture composed of three parts of the fluid extract of buchu or of Pareira, with one of the tincture of hyoscyamus or of the tincture of conium, and half a teaspoonful of the bicarbonate of sodium four times daily, or liberal quantities of Vichy or other alkaline mineral water, will often give relief. The diet should be light, and the bowels kept open by salines.

Local or general pathological conditions that act as causes should be sought for and treated.

10. In the treatment of *acute cystitis* due to septic infec-

tion the remedies mentioned above may be used as palliatives. But the chief reliance must be placed upon local treatment. A vaginal douche of 1–4000 corrosive mercuric chlorid should be given every eight hours, followed each time by a bladder douche of a saturated solution of boracic acid or of a normal (0.6 per cent.) solution of table salt (part 1, chap. IV, par. 4) for two or three weeks, or until the symptoms have subsided and the urinalysis shows no evidence of pus.

In subacute and chronic cystitis various remedies have been used with benefit. Ten grains (or 0.66 gm.) of sodium salicylate every four hours, or the same quantity of boracic acid or of benzoate of ammonia dissolved in an infusion of buchu or uva ursi, or given with half a teaspoonful of the fluid extract of triticum repens, are the ones most often used.

In gonorrheal cystitis and urethritis a mixture of powdered cubebs and balsam of copaiva in proportion to make a soft mass may be prescribed. The patient is directed to roll it into pills of convenient size and take two or more of them four times daily, or as much per diem as the stomach will tolerate without destroying the appetite. A little oil of wintergreen may be added to the mass to flavor it.

11. In *chronic persistent cystitis* drainage of the bladder by means of a vesico-vaginal fistula (T. A. Emmet) has sometimes effected a cure. A sound is introduced into the bladder, and the point turned down until it causes a projection on the anterior vaginal wall in the median line, which is then cut down upon until the bladder is opened. The incision should be made in the median line and about ⅔ of an inch (2 cm.) long, and the edges of the mucous membrane hooked down with a tenaculum and stitched to those of the vagina with chromicized catgut. Three or four vaginal douches of a saturated solution of boracic acid or

one per cent. of creolin should be used daily. The opening may be maintained for several weeks if necessary, and can then be closed by splitting the vesico-vaginal septum between the united edges of mucous membranes, and suturing them (part 4, chap. III, par. 6).

If the urethra is not sensitive the bladder may be drained for a short time by means of a self-retaining catheter, as recommended after operations for urinary fistula (part 4, chap. III, par. 7).

CHAPTER VI.

ACUTE ENDOMETRITIS. ACUTE METRITIS.

1. Inflammation of the uterus may be classified as follows:—

(*a*) Acute Endometritis, or Acute Metritis.
(*b*) Chronic Cervical Endometritis.
(*c*) Chronic Corporeal Endometritis.
(*d*) Subinvolution and Sclerosis, or Chronic Metritis.

Acute inflammation of the endometrium does not occur without some participation of uterine walls, nor does inflammation of the uterine walls occur without participation of the mucosa, hence a description of acute metritis and endometritis as two distinct diseases would be useless for clinical purposes. Long-continued or chronic inflammation of the uterine walls and mucosa, although usually associated, acts differently, however, upon these tissues, giving rise to two distinct clinical pictures, each of which demands a separate description.

ACUTE ENDOMETRITIS. ACUTE METRITIS.

2. **Pathology.** In *acute inflammation* the mucous membrane of the body of the uterus is hyperemic, thickened, and softened, and somewhat loosened in its attachment to the

muscular wall. The epithelium is in part desquamated. The glands are but little changed, but the spaces around them are densely packed with embryonal cells. A mucous or muco-purulent discharge usually bathes the surface.

The uterus is more or less enlarged, according to the intensity of the inflammation. Its walls are hyperemic, swollen, and softened by the infiltration of serous or sero-purulent fluid. Minute extravasations of blood are apt to be found in spots, particularly near the mucous membrane.

The peritoneal surface may be merely hyperemic, or very much thickened, or covered by a flaky exudate.

The cervix is in a state of hyperemia and serous infiltration, or may show all of the characteristics of a primary cervicitis.

An abscess has a few times been found in the uterine walls, but Pozzi affirms that an abscess never occurs as the result of metritis.

When the inflammation affects the mucous membrane more than the walls it is termed *endometritis;* when it produces extensive changes in the walls it is called *metritis;* when it involves the peritoneal surface a *perimetritis* is added to the metritis.

3. **Etiology.** There are three kinds of causes: viz., those connected with (*a*) disturbance of menstruation and involution, (*b*) septic causes, and (*c*) traumatism connected with chronic inflammation in the uterus or its surrounding tissues.

(*a*) Catching cold or other influences, such as overexertion, excessive coitus, traumatism, acting during the menstrual congestion, or after an abortion, may increase that congestion or interfere with its subsidence in such a manner as to be followed by inflammation.

(*b*) Among septic causes are infection during abortions, operations, examinations, uterine or vaginal douches, masturbation, etc., by means of infected hands, instruments, or

other substances introduced into the genital tract. Infection may secondarily affect foreign bodies left in the uterus or vagina, such as the retained decidua after abortion, stem pessaries, tents, tampons, etc. Microbes connected with a vulvar or vaginal disease may find their way into the endometrium. Gonorrhea is a frequent cause of the disease.

(*c*) Traumatism, such as intrauterine applications, and those causes already mentioned as being potent during the menstrual period, may produce acute metritis when there is already a chronic metritis, or a uterine congestion depending upon disease of the uterine appendages and surrounding peritoneum and connective tissue.

4. The first **Symptom** may be a chill, followed by fever, or fever may supervene without a previous chill. The temperature may be but slightly elevated or may go up to 103° Fahrenheit, or even higher. If the attack begins at the time of the menses, or after abortion, the flow is almost invariably suppressed. In a few cases, however, metrorrhagia exists and persists. Pain of a dull, aching character is felt over the pubes, in the vagina, and in the lumbar region, often extending down the limbs. Headache and sometimes nausea are noticeable.

When the peritoneal surface of the uterus is implicated, lancinating pains are felt in the lower abdomen. In case the cervix be small or flexed upon the body of the uterus, occasional colicky pain may be felt in the same region. Tenesmus, dysuria, and painful defecation are frequent symptoms.

The uterine secretions are at first suppressed, but in those cases which are confined mostly to the mucous membrane a thin, transparent or turbid muco-purulent discharge usually follows.

When the endometrium becomes affected as the resu't of a preceding vaginitis the transient dry stage, characterized by a suppression of the discharge, is not noticed because of the vaginal discharge. The symptoms in such cases may be very mild.

5. The chief *physical signs* are local tenderness over the pubes, and tenderness of the uterus to the vaginal touch and to bimanual pressure. Abdominal pressure exerted in consequence of coughing, straining, standing, sitting, etc., is usually painful. The cervix is softer, larger, and redder than natural, particularly about the external os, and when the uterine walls are affected the entire organ is considerably enlarged and softened.

When the inflammation is confined to the neighborhood of the mucous membrane there is but little swelling and tenderness of the uterus, but the discharges are abundant.

6. The *course* of the disease varies according to the character of the inflammation. In non-septic cases connected with menstruation the temperature may be quite high for one or two days, but it then begins to subside and is apt to be normal at the end of a week. The pain and tenderness diminish, but some backache and slight tenderness may persist for several weeks.

In the catarrhal variety, or that which affects the mucous membrane chiefly, the temperature seldom rises above 100 or 101° F., and in two or three days subsides to 99° F., or to normal. A slight backache, and sometimes a burning in the vagina, remain for one or two weeks longer. The discharge may continue for an indefinite period unless checked by prompt treatment of the disease.

In cases due to traumatism and infection chills recur daily or oftener, and the temperature rises every afternoon from two to four degrees, with profuse perspirations and sometimes with offensive diarrhea. The symptoms may

gradually improve and pass off, or the chills may increase, the temperature go to 104° or 106° F. once or twice daily, and the pulse reach 120 or 140°, while peritoneal pains, delirium, subsultus tendinum, and a dry, furred tongue indicate that the poison has already produced pathological changes beyond the uterus.

7. **Prognosis.** Death scarcely ever results, but chronic inflammation often follows. In severe septic cases, however, there is danger on account of the liability of the neighboring tissues to become affected with sepsis.

8. The **Treatment** varies somewhat, according to the nature of the case.

In those connected with sudden suppression of the menses the treatment already given for that affection is appropriate. The immediate reappearance of the menses is usually attended by partial or complete relief. Rest in bed for a few days with hot fomentations and subsequent counterirritation complete the cure. When the menses do not reappear the patient must be kept in bed until the main symptoms subside, and then be kept quiet for a month, while counterirritation over the lower abdomen, mild laxatives, a bland diet, sitz baths at a temperature of 100° F., hot douches at 115 to 120° F. are faithfully used, with the intention of preventing the disease running into the chronic form. Scarification of the cervix and glycerin tampons may be tried in case there is no serious objection to a physical examination. At the time for the next period an attempt should be made to bring on the menses. (See part 3, chap. II, par. 17.)

9. When the disease results from decidual or placental remains, the uterus should be thoroughly curetted, swabbed out with 95 per cent. carbolic acid, then douched out with corrosive mercuric chlorid, 1 to 2000, followed by a plain

sterilized hot water douche. A bacillus containing a dram (4 gm.) of iodoform should be left in the uterus.

If, however, the infection has been acting for some time, the uterine mucous and submucous tissues become infected, and it is necessary to repeat the intra-uterine douche twice daily, once with 1–3000 corrosive chlorid and once with two per cent. carbolic acid solution, followed each time by a plain sterilized douche to wash away the mercury or carbolic acid, which might otherwise poison the patient.

A uterine douche of a saturated solution of boracic acid repeated every four or six hours, and lasting each time for half an hour or longer, may take the place of the stronger antiseptic douches in case there should be any signs of poisoning.

10. When the attack follows an operation the sutures must be removed if any be present, and the wounded surfaces exposed, curetted, touched with strong carbolic acid, and treated with antiseptic douches of the same character as for retained placenta (par. 9).

11. In all cases in which the onset is connected with much pain and fever, an icebag over the epigastrium acts beneficially as an anodyne and antipyretic as well as local sedative. One or more full doses of morphin may be required for pain and restlessness. The bowels should be moved by salines or other mild laxatives. After the more severe symptoms have subsided, hot fomentations are better than cold, which should usually not be used longer than 24, or at most 48 hours, unless it be indicated for persistent high temperature. Severe septic symptoms call for large quantities of alcoholic stimulants, a concentrated liquid diet, and quinin in tonic doses.

12. In gonorrheal cases much may be done in the way of prophylaxis by using frequent vaginal douches for the vaginitis (chap. III, par. 8). When the endometrium becomes

infected it should be treated as recommended (par. 9) for retained decidua, and be followed by as frequent intra-uterine douches of a one per cent. solution of carbolic acid or 1–4000 solution of potassium permanganate as can be tolerated by the patient. After the acute symptoms pass off the strength of the solution may be doubled or astringent solutions be substituted.

Sitz baths, tampons, and all local treatment that involves disturbance of the parts should be avoided in the acute painful stage of the inflammation, unless necessary to remove infection. This is particularly true of cases connected with preexisting inflammation.

CHAPTER VII.

CHRONIC CERVICAL ENDOMETRITIS.

Synonyms.—*Endometritis Cervicis, Endocervicitis, Cervicitis, Cervical Catarrh, Trachelitis, Erosion of the Cervix.*

1. **Pathology.** Cervical endometritis is characterized by hyperemia, and thickening of the cervical mucous membrane and hyper-secretion of the glands. The mucus may be unaltered, or it may be thicker than normal, or it may become slightly purulent, or even bloody.

After the inflammation has lasted for some time, the exfoliation of the epithelium becomes so rapid that the epithelial new cells, although sufficiently numerous to cover the entire surface, are small and imperfectly developed. The surface has a red, denuded appearance, resembling ulceration. The condition is called *simple erosion.*

2. As the hyperplasia increases, the swelling of the

mucous membrane is out of proportion to that of the underlying walls, and is either thrown into a multitude of minute folds, or overfills the cervical cavity, dilates the external os, and rolls out into view.

FIG. 146.—PAPILLARY EROSION. (*Schroeder.*)

The first of these changes is called *papillary erosion*, for the small folds look like red papillæ. The young epithelial cells, which are numerous and small, are crowded on the

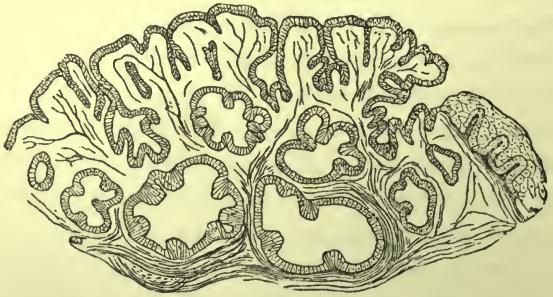

FIG. 147.—FOLLICULAR EROSION. (*Schroeder*)

surface so as to assume a slender, almost needle shape, looking like palisades when seen in section under the microscope (Fig. 146).

The glandular pockets formed by these folds reach down to and between some of the bundles of muscular fibers. These pockets, as well as the glands, may become stopped up and filled with secretion, giving rise to the condition called *follicular* erosion. These cysts thus formed are of all sizes, up to that of a pea (Fig. 147).

3. When the hyperplasia is great, the membrane forces open the external os and pouts out, giving the cervix the appearance as if the vaginal portion were partly clothed with cylindrical epithelium. The condition is called *eversion* or *ectropion*. Laceration of the cervix is a common complication of this condition.

4. When the hyperplasia affects the structures more actively and to a greater depth, other changes are produced. The mucous membrane throws out large projecting folds that may or may not develop into *mucous polypi*, or polypoid masses. Or the occluded and cystic pockets and Nabothian glands project upon the surface the size of a pea, or even larger. These, if numerous, may occupy half of the thickness of the cervical walls, and thus produce *cystic degeneration*. Occasionally one large cyst the size of a hickory-nut or walnut is found that stretches the tissues around it to the extent of almost obliterating a portion of the cervix.

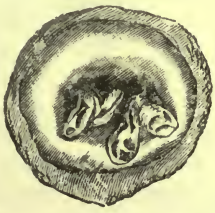

FIG. 148.—MUCOUS POLYPI GROWING IN THE CERVIX UTERI. (*Overlach.*)

As a result of these changes, all of the glandular structure may be finally destroyed, and a sclerosis, resembling senile atrophy, result. This may be regarded as a spontaneous cure.

In some instances the hyperplasia affects the cervical walls more profoundly than the mucous membrane, causing them to become thickened or elongated as a whole or in part. In nulliparæ who have

been affected with gonorrhea, the purulent character of the discharge may subside and leave a large, deeply colored cervix, or even approximately normal-looking cervix, from which a large but exceedingly tenacious plug of mucus hangs, which is in some instances clear, in others tinged with blackish blood. In these cases there is submucous hyperplasia and usually an approximation of the indurated cervical walls, causing a sort of stricture, at the internal os. The obstruction to the circulation at this point is connected with a tendency to hemorrhage from the minute venous radicles. The gonorrheal poison has apparently disappeared in most cases.

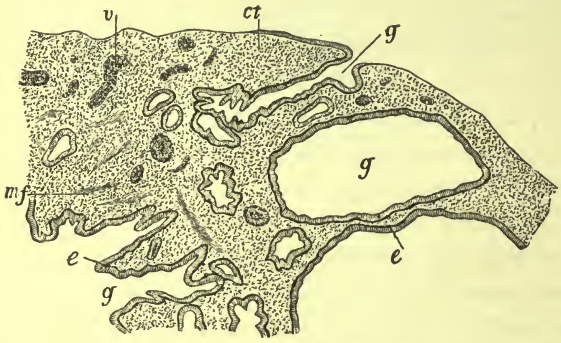

FIG. 149.—MICROSCOPIC SECTION OF A MUCOUS POLYPUS. (*De Sinéty.*)
g. Dilated glands. *e.* Epithelium. *mf.* Muscular fibre. *v.* Bloodvessel *ct.* Connective tissue.

The interference with the circulation due to the hyperplasia, and the continued superficial irritation and imperfect formation of epithelium, cause a varicose enlargement of small superficial vessels that can often be seen through the speculum. The vaginal portion of the cervix is apt to be dark red or purplish, presenting a strong contrast to the red patches of erosion.

True ulceration, such as is found at the site of a laceration or cautery of the cervix, has the appearance of granular erosion, and may after a time secrete a serous instead of purulent fluid.

5. **Etiology.** The cervix is much more exposed than the uterus to traumatism and septic influences, hence cervical endometritis is a more common disease than corporeal endometritis. The causes are :—

(*a*) *The conditions attending corporeal endometritis.*

The inflammation may arise simultaneously with the endometritis, or in a spread of inflammation from the endometrium by contiguity, or from the irritation of the uterine discharge.

(*b*) *Infection from the vagina.*

This may take place as an ascending inflammation, such as gonorrheal or purulent vaginitis. The vulvitis of children may be, or may become, septic and spread to the vagina and cervix. Or the disease may result from the entrance of foreign bodies or septic germs into the vagina. Examinations, operations, coitus, masturbation, introduction of pessaries, vaginal douches, etc., may infect the cervix directly, with or without simultaneously infecting the less delicate vaginal membrane.

(*c*) *Traumatism, with immediate or subsequent infection.*

Lacerations of the cervix during parturition or abortion, operations upon the cervix, strong local treatment, attempts at abortion, etc., act in this way. Lacerations are the most frequent causes of the worst forms. (See part 4, chap. v, par. 4.)

(*d*) *Conditions of lowered vitality and imperfect function* favor relaxation of the pelvic tissues and a sluggish pelvic circulation, and thus strongly *predispose* to the disease.

The vaginal mucous membrane may resist infection that inoculates the delicate and complicated cervical mucous membrane. The diseased vaginal membrane may recover quite promptly and the cervical disease persist.

6. **Symptoms.**—Leucorrhea is the most constant symptom. The discharge is usually abundant, and may be a thick, clear, stringy mucus, or a slightly yellowish mucopus. After mixing with the acid secretion of the vagina it may appear at the vulva as a somewhat sticky, milk-white

fluid called the whites. It may, however, be expelled from the vagina in stringy masses just as it comes from the cervix. When profuse it becomes debilitating. In the severer forms of erosion bright-red blood, and in polypoid disease a brownish discharge in small quantities, are occasionally noticed.

Sterility is common in cases without laceration, and may be due to the mechanical obstruction afforded by the tenacious plug of mucus that fills the cervix, or to disease in the uterus or Fallopian tubes.

7. A burning pain in the vagina and bottom of the pelvis, with backache and sensations of weight in the pelvis, are the chief subjective symptoms. In cases of follicular degeneration with eversion, the irritation from the distended follicles is such that nearly all of the symptoms of endometritis may be felt. (Chap. VIII, par. 7 to 12.)

Reflex vomiting, headache, forgetfulness, and extreme nervousness are sometimes quickly relieved by a few local treatments consisting of evacuation of the cysts and obliteration by applications, and this after the failure of efficient medical treatment.

8. **Diagnosis.**—Digital examination reveals a softened rim around the os or, in cases of extensive cystic degeneration with eversion, a soft, elastic condition of the entire lower end of the enlarged cervix. Isolated distended follicles sometimes feel like shot buried under the surface.

The speculum examination reveals the true condition. Simple erosion presents a bright-red, glistening surface around or beside the os, or extending into it and out from it. Papillary erosions are of the same color, but have the appearance of consisting of fine granulations, or of delicate folds passing longitudinally up into the cervix. Follicular erosion may give the appearance of several large, flat, or slightly elevated patches corresponding to the inflamed and

cystic follicles underneath, or of small red spots corresponding to the inflamed mouths of follicles that are not much distended. When follicular cysts become superficial they project slightly, and may appear paler than the surrounding area. When punctured a large drop of mucus is partly expelled, and adheres to the spot. Deep-seated cysts often produce no superficial redness, and their location may then be felt, but not seen.

Cystic degeneration, which is usually associated with lacerations, extensive eversion, and enlargement of the cervix, produces a deep-red, or a mottled, angry-looking surface, upon which, in some cases, enlarged blood-vessels and raised cysts may be seen. Repeated punctures bring mucus drops of various size into view. Slight dilatation of the cervix causes the viscid contents of the follicles to be expelled more abundantly.

The inside of the cervix can be seen by dilating the external os and drawing the lips apart with tenacula. Either the bivalve or Sims' speculum may be used.

9. Cases of cystic degeneration or polypi may assume the appearance of malignancy. Carcinoma gives a crumbly, granular sensation to the touch when superficial, or a board-like, nodular feeling when interstitial, while the benign affections mentioned render the surface soft and velvety, with, perhaps, small, hard elevations corresponding to cysts. The color of cancerous ulcerations is lighter, with a yellowish cast, and they are often excavated, with ragged margins. Puncture of hardened or elevated spots in case of carcinoma causes them to bleed profusely instead of letting out mucus. Sarcoma and myxo-sarcoma may feel soft, but the symptom of hemorrhage is so pronounced that the seriousness of the trouble would soon be suspected. Microscopic examina-

tions of excised pieces are sometimes necessary to clear up the diagnosis. (See diagnosis of cancer of the cervix, part 8, chap. III, par. 15.)

10. The **Prognosis** in cases uncomplicated by inflammation of the endometrium or uterine adnexa is good with proper treatment; but the disease has very little tendency to get well of itself after the glands have become cystic until the diseased portion of the cervix has been destroyed by their rupture and obliteration. The cure, unless it be by radical operation, is often a slow and tedious one. After inflammation has existed for a long time in a severe form, the danger of malignant transformation must not be overlooked.

11. **Treatment.** Simple erosion, although of long duration and connected with chronic conditions, partakes somewhat of the nature of acute inflammation. The sources of irritation must be removed and the effects counteracted by mild antiseptic and astringent applications. Endometritis, vaginitis, and urethritis, if present, should be treated, and uterine displacements corrected. Indigestion and malassimilation should be attended to, the evacuations from the bowels regulated, the condition of the blood improved by iron tonics, and the circulation and nervous and muscular tone treated by massage and active but carefully regulated out-of-door exercise and Swedish gymnastics (part 1, chap. V, par. 11).

Vaginal douches of a one per cent. solution of carbolic acid, lead acetate, or of 1–3000 potassium permanganate, used twice daily, have a beneficial effect upon the parts reached by them, and help to keep the vagina clean and break up the cervical plug of mucus.

Small cotton tampons soaked in a 50 per cent. solution of boroglycerid in glycerin may, with some benefit, be

introduced by the patient every night after a douche, and removed the next morning before taking a douche.

Astringent local applications twice or three times weekly through the speculum, such as the tincture of iron, a ten per cent. solution of copper sulphate, or crude pyroligneous acid, are used to harden the infiltrated tissues and prevent the rapid exfoliation of epithelium. In some cases the application once in a week or ten days of strong carbolic acid acts well. After the application a cotton pledget saturated with the boroglycerid should be placed against the cervix, and a wool tampon under that to act as a support to the circulation. They should be removed by the patient the next day at bedtime.

In all cases both the external and internal os should be well dilated with sounds, and the application applied freely on an applicator or forceps wrapped with cotton to the entire cervical cavity and to the vaginal portion. The mucus must first be well wiped out. A vaginal douche at 120° F. just before the treatment will usually coagulate it, or the astringent application, by repeated swabbing, may be made to do so.

The medicated pledgets or tampons consist of a small piece of folded cotton about the size of a spool of thread, with a string tied around it to facilitate its removal by the patient. The wool tampons are best made by separating the wool in layers about half an inch thick, and cutting them in squares from three to five inches, eight to fifteen cm., in diameter. These pieces are then drawn out to about double their original diameter and placed upon a layer of cotton as large, or a trifle larger, but very thin. The four corners of both the cotton and wool are then drawn together, making a soft ball with the cotton on the outside, and the corners are tied together by a thread left long enough to reach from the cervix outside of the vulva. The best grade of commercial cotton is better for both the medicated tampons and the covering of the wool, for it retains the medicament longer, and keeps the wool dryer, than would the absorbent cotton, and irritates the vagina less than bare wool. Douches should not be used while the tampons are in place. If the best commercial cotton cannot be obtained, an ordinary quality may be used after being

sterilized by baking in a sterilizer or oven. (Part I, chap. IV, par. 9 and 10.)

Boracic acid and other powder may be placed against the cervix above the tampon, but they sometimes produce mechanical irritation and do harm instead of good.

Dry medicated cotton tampons have been used with benefit. (Engelmann.)

12. In the treatment of *follicular erosion* our endeavor should be to disinfect the glands and obliterate those follicles whose functions are already destroyed by the inflammation. Carbolic acid, compound tincture of iodin, and a mixture of equal parts of carbolic acid and tincture of iodin are among the most efficient remedies. Dilatation of the cervix just prior to the application assists in some cases by causing an evacuation of the contents of the follicles. When the outlets present the appearance of a multitude of red points, it is well to lightly scarify the whole surface, for the purpose of relieving the congestion, evacuating small cysts, and preparing the surface for the penetration of the remedy to be applied. The punctures should be allowed to bleed a little, and the bleeding then be checked by pressing absorbent cotton firmly against the cervix. After that the compound tincture of iodin or other remedy should be applied, and a small tampon of cotton saturated with a ten per cent. solution of ichthyol in glycerin placed under the cervix to maintain the antiseptic and alterative action. A wool tampon is then inserted in the vagina, and both tampons are left for the patient to remove the next day at bedtime. A hot injection of 1–2000 solution of corrosive mercuric chlorid is used and repeated twice daily, except while the tampons are in.

Potassium permanganate 1–2000, or carbolic acid one per cent. may be occasionally substituted for the corrosive chlorid for a week

or two at a time, to avoid the danger of mercuric poisoning. Two quarts should be used at a time.

13. *Cystic degeneration* of the cervix may be treated in the same way, except that the punctures must be deeper and the application stronger. The cysts must be laid wide open and carbolic acid, solution of acid nitrate of mercury, or the solution of the chlorid of iron be applied. When there is eversion and great redundancy of tissue, and the degeneration affects some parts more than others, fuming nitric acid may be applied to the worst places. The electrocautery can be made to destroy these limited portions very neatly and efficiently. A general application of nitric acid or other powerful caustic is not advisable on account of the danger of producing cicatricial contraction of the cervix.

When there is extensive degeneration of the mucous membrane with laceration and eversion, the mucous and submucous tissues should be excised after the manner recommended by Carl Shroeder. (See part 4, chap. v, par. 11.)

Polypi should be cut off and the tissue about the base cauterized.

Ulcers of small size call for antiseptic douches and occasional local applications such as were recommended for follicular erosion (par. 12). Large ulcers should be treated by an excision of tissue that will allow of an approximation of the raw surfaces or of the mucous membrane over them.

CHAPTER VIII.

CHRONIC CORPOREAL ENDOMETRITIS.

DILATATION AND CURETTAGE OF THE UTERUS. BENIGN ADENOMA.

1. **Pathological Anatomy.** In chronic corporeal endometritis the mucous membrane is from two to ten times as thick as normal and of a dark red color. Near the surface extravasations of blood are frequently found which give rise to a mottled appearance. The enlarged and pouting mouths of the glands can be seen by the naked eye. The surface is soft and vascular, sometimes smooth, sometimes partly or completely covered with elevations of papillary or cystic nature. At other times the uterine cavity is filled with large hypertrophied glandular masses.

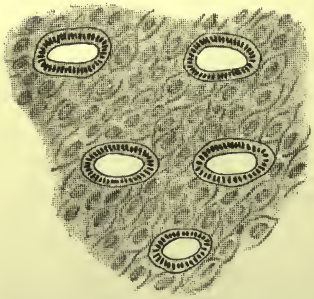

FIG. 150.—NORMAL ENDOMETRIUM. (*Ruge.*)

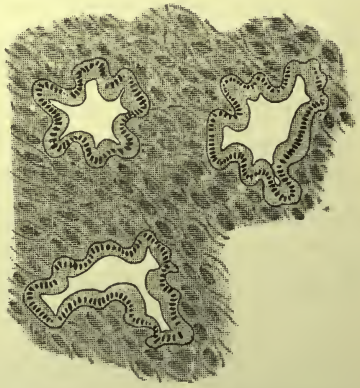

FIG 151.—GLANDULAR HYPERTROPHIC ENDOMETRITIS. (*Ruge.*)

2. Microscopical examination reveals four forms of inflammation, the glandular, interstitial, and the mixed forms

of Ruge, and the polypoid or fungous form of Recamier and Olshausen.

The *glandular form* of endometritis is further divided into two varieties, the glandular hypertrophic and glandular hyperplastic.

The hypertrophic variety consists of an enlargement of the utricular glands, causing them to project upon the surface of the mucous membrane, showing enlarged, irregular apertures with dentated edges (Fig. 151); or to form lateral projections beneath the surface, or even to assume corkscrew or other exaggerations of the normal irregularities in shape (Fig. 157.) The epithelium undergoes proliferation, but is always found as a single layer.

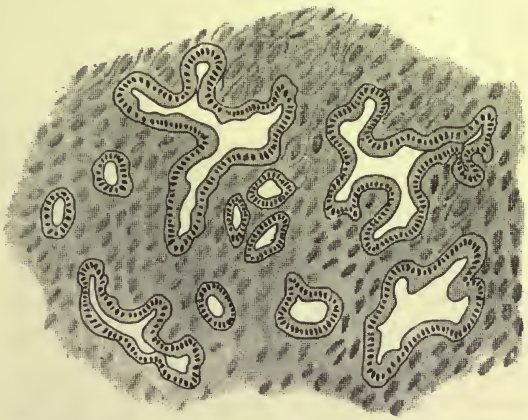

FIG. 152.—GLANDULAR HYPERPLASTIC ENDOMETRITIS. (*Ruge.*)

The hyperplastic variety is characterized by an increase not alone in size but in the number of glands. (Figs. 152 and 158.)

3. In the *interstitial form* of endometritis the interglandular connective tissue cells undergo proliferation and

transformation into cicatricial tissue, which, as they increase, compress the glands causing their partial and sometimes complete obliteration. (Figs. 153, 154 and 156.) Cyst-formation due to closure of the glandular outlets is quite common. In extreme cases of long duration the mucous membrane becomes atrophied and the muscularis is covered by a thin layer of sclerosed connective tissue and epithelium, without cilia (endometritis atrophica).

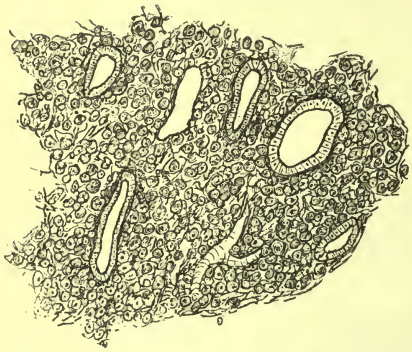

FIG. 153.—INTERSTITIAL ENDOMETRITIS. (*Ruge.*)

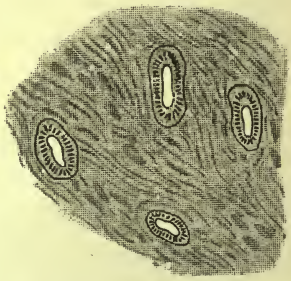

FIG. 154.—CHRONIC INTERSTITIAL ENDOMETRITIS. (*Ruge.*)

According to some observers the infiltration about the glands consists mainly of the proliferation of the intercellular substance (Ruge), or of an accumulation of leucocytes (van Tussenbroek and Mendes de Leon),* or of protoplasmic bodies (Johnstone), which penetrate and distend the glands and in time destroy them, and finally give rise to the formation of organized connective tissue fibers that supplant the normal mucous membrane. The arterioles, at first increased in size, are finally destroyed by infiltration of their walls and

* *Archiv für Gyn.*, Vol. XLVII, No. 3.

swelling of their endothelium. Extravasation of blood in the tissues sometimes takes place.

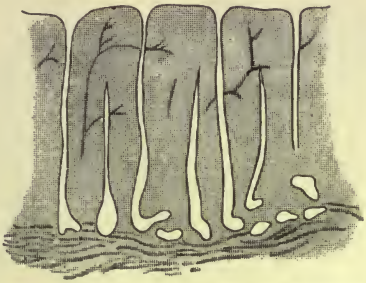

Fig. 155.—Section of the Normal Mucous Membrane. (*Ruge.*)

4. The glandular and interstitial forms of inflammation may be mixed in variable proportions in different cases, and in different parts of the same endometrium (endometritis

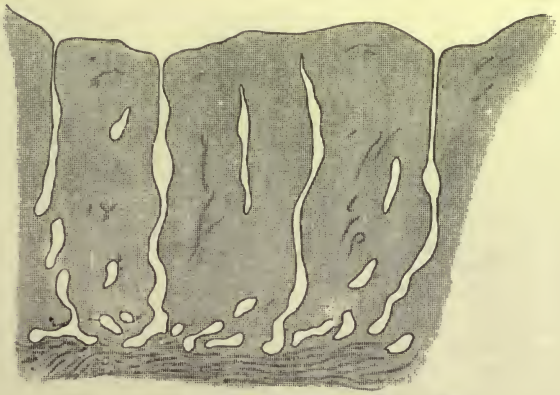

Fig. 156.—Interstitial Endometritis. (*Ruge.*)

diffusa), causing usually the whole, but sometimes parts of the mucous membrane to become softened and thickened. The blood-vessels are increased in number and enlarged to a marked degree.

5. The *fungous* or *polypoid form* is similar to the mixed form with the predominance of cyst-formation. In some

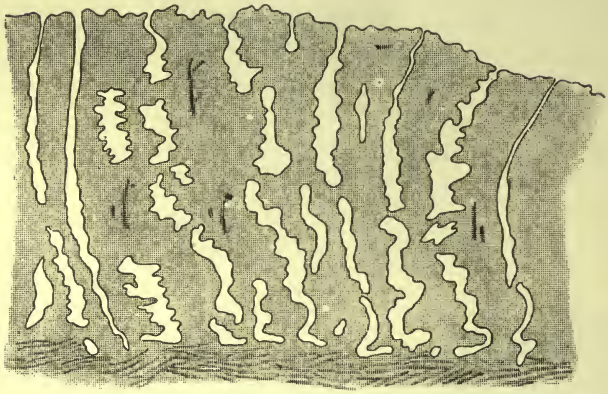

FIG. 157.—GLANDULAR HYPERTROPHIC ENDOMETRITIS. (*Ruge.*)

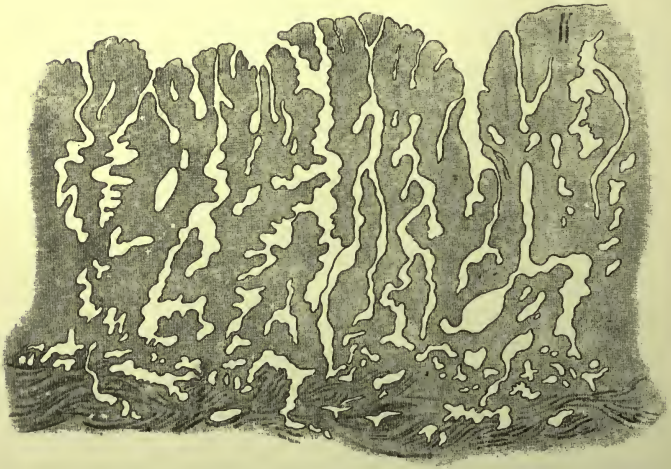

FIG. 158.—GLANDULAR HYPERPLASTIC ENDOMETRITIS. (*Ruge.*)

cases the whole mucous membrane is thickened, in others only portions, and in others the glands are chiefly affected,

and project as polypoid masses. There seems to be no limit to the vascularity and amount of thickening. The condition is one of *benign adenoma*.

When endometritis occurs after abortion, the decidual cells do not always undergo atrophy in all parts alike, and leave small islands of decidual cells with proliferation of small cells in the surrounding tissue (endometritis decidualis).

In some cases of interstitial endometritis, the superficial portion of the mucous membrane is thrown off in shreds, or as a cast of the uterine cavity. Changes in the cells and their nuclei may give the appearance of attempted formation of a decidua. (See part 3, chap. IV, par. 19.)

Endometritis has been variously classified according to its etiology and clinical history, giving rise to the names, catarrhal, gonorrheal, papillary, dysmenorrheal, exfoliative, atrophic endometritis, etc.

6. The **Causes** of chronic endometritis are numerous. It may result from—

(*a*) *Acute metritis.*

(*b*) *Disturbed involution* after abortion or labor, such as laceration of the cervix, getting up too soon, coitus, blows, taking cold, etc.

(*c*) *Disturbed menstruation*, by taking cold, fatigue, continuous exertion, stenosis of the cervix, ovaritis, etc.

(*d*) *Interference with the uterine circulation* by mechanical causes, such as uterine displacements, pelvic or uterine tumors or exudates, inflammations, or other morbid processes in or about the pelvis.

(*e*) *Infection;* either by direct infection of the endometrium by means of hands, instruments, or other foreign bodies, or from an ascending septic inflammation of the vulva or vagina, as in the case of a gonorrhea or purulent vulvitis of childhood.

An anemic and debilitated condition is supposed to lead to endometritis. The flow is not as regular and abundant as it should be,

the uterine hyperemia is not sufficiently relieved each month, and hyperplasia of the endometrium results.

In the majority of cases there is no history of an acute attack, particularly in young girls. Gonorrhea, suppression of the menses from cold, and infection after abortion or operation, bring on acute attacks first. Nearly all of the other causes act more insiduously, and produce slight attacks that, from time to time, become worse by reason of repeated and often unheeded exacerbations. After a small or moderate amount of congestion or inflammation of the endometrium has existed for a time, its resistance to infection is diminished, and sepsis from the vagina is apt to find its way into the uterine cavity.

7. **Symptoms.** The symptoms of endometritis, whether the case be a severe one or not, may be so slight as scarcely to have attracted the patient's attention, or they may be so pronounced as to render her life a burden.

Menorrhagia is the most common symptom, and sometimes becomes so prominent as to give rise to the term hemorrhagic endometritis. The flow may be profuse and clotted, and may persist some time longer than normal, and even be present during a larger part of the intermenstrual period. The mixed form (endometritis diffusa, par. 4) and the fungous or polypoid, are the most apt to be attended with much hemorrhage.

8. Leucorrhea is nearly always present between the periods, although in old cases it may become so slight as not to attract the patient's attention, and after sclerosis of the mucous membrane has resulted, may be absent altogether. Not uncommonly the leucorrhea follows the menstrual period, and ceases or becomes almost imperceptible after lasting a few days or a week. The discharge consists of a thin, clear mucus, or of a muco-pus, containing some epithelial cells, leucocytes, and perhaps lymph corpuscles. As it appears at the vulva, it is milky-white, creamy, or greenish in color, owing to a mingling with cer-

vical and vaginal discharges. When it is mixed with blood, it may acquire a pink, brown, or smoky tint. The presence of pus, blood, or cervical mucus causes it to stain the linen.

The normal uterine discharge has the character of a thin mucus, that of the cervix of a thick viscid mucus, that of the vagina of a thin slightly milky fluid.

As the uterine discharge is mixed with the cervical and vaginal secretions on its way to the vulva, it is usually impossible, without an examination, to determine what is the character of the uterine discharge or whether there is any uterine discharge. By wiping out the cervix and dilating the internal os we can sometimes cause the expulsion of some of the intrauterine discharge, although by our manipulations we are apt to abrade the mucous membrane and cause the admixture of a small amount of blood with it.

Leucorrhea is said to depend in some cases upon anemia and chlorosis.

9. Pain of some kind is rarely absent. Backache in the lumbar or sacral region is perhaps the most common and characteristic. Pain in one of the iliac regions or at the junction of the iliac and hypogastric regions, aching over the pubes, bearing-down sensations in the vagina and perineum, pelvic heaviness and reflex pains in the urethra, rectum, clitoris, breasts, and intercostal regions, belong to the ordinary symptoms, as are also pains in the occipital, frontal, and temporal regions. The suffering or discomfort is usually worse in the latter part of the day if the patient is on the feet much of the time.

Uterine colic between the menstrual periods, due to an accumulation of mucus in the uterus and relieved by its expulsion, has frequently been observed. In some instances one severe attack of this kind will occur about half way between the menses. It is called intermenstrual pain, and is supposed by many authors to depend upon accumulations in the Fallopian tube.

A reflex cough may be caused by uterine inflammation.

10. Indigestion, gastro-intestinal fermentation, gastralgia, abdominal pains, meteorism ("bloating") and constipation with accompanying anemia, debility and mental depression, palpitation of the heart, are among the effects of the disease upon the alimentary canal.

These conditions are partly due to the direct effect of the uterine inflammation, partly to the sedentary habits necessitated by the disease, partly to improper diet, unhealthy hygienic surroundings, and to the unnatural demands upon the nervous system incident to the customs of civilization.

11. Besides pain there are other nervous symptoms and conditions which demand attention. Neurasthenia and hysteria with perverted mental action, such as a tendency to exaggerate symptoms, insomnia, fits of alternate hilarity and depression, unreasonable irritability, mental depression bordering on melancholia, hysterical spasms resembling catalepsy, epilepsy, simulated or even real insanity, are the most important.

12. Sterility is a frequent but not invariable result of the disease. Sometimes the ovum does not reach the uterus, or is destroyed by the secretion, or forms no attachment to the endometrium, or it is regularly aborted.

13. **Physical Signs.** A slight symmetrical enlargement of the uterus is felt bimanually. The introduction of the uterine sound is ordinarily, although not invariably, painful, the most tender spots being the internal os and the fundus. Occasionally patients become nauseated, and some have been known to fall down in syncope upon attempting to assume the erect position soon after its passage.

The withdrawal of the sound is followed by a gush of thin, clear, or bloody mucus; or a little blood may be found on the end of the instrument. The cavity usually measures three inches (8 cm.), which is a little more than

the normal. When unconnected with parametritis or perimetritis, the uterus is freely movable upon the finger and surrounded by soft elastic tissues. Rigid sacro-uterine ligaments due to the spread of the inflammation to these tissues not frequently accompany endometritis and may make the uterus seem immovable. In such cases the uterus is firmly held in the back part of the pelvis, but can be moved bimanually a slight distance from side to side and upward and downward.

14. **Diagnosis.** When from the severity of the symptoms carcinoma, sarcoma, adenoma, or retained decidua is suspected, a portion of the endometrium should be removed by the curette and subjected to a microscopical examination.

Corporeal endometritis seldom exists without some cervical endometritis, but as cervical endometritis is frequently found without participation of the endometrium above the internal os, we must be careful not to mistake the thick tenacious cervical mucus for corporeal mucus.

The slight enlargement of endometritis is usually symmetrical without making the uterus any rounder, and may be accompanied by some softening of the muscular tissue. Enlargement from intrauterine growths or pregnancy make the uterus decidedly rounder or larger antero-posteriorly in proportion to the increase in length. Neoplasms in the uterine walls increase the size of the uterus irregularly.

The uterine discharges of endometritis sometimes have a disagreeable, leathery odor as they appear at the vulva, but never have that stinking odor of decomposing meat, nor the dish-water character, of the discharges produced by malignant disease and tuberculosis.

15. The **Prognosis** is usually favorable as far as life and death are concerned; but most cases require prolonged treatment, and some seem incurable. Hemorrhages, abortions, and digestive disorders may affect quite seriously the patient's general health.

In the diffuse and polypoid forms the danger of malignant degeneration should not be forgotten.

16. **Treatment.**—Cases with profuse menorrhagia and unaccompanied by tumors or diseases in the adnexa or pelvic peritoneum or connective tissue, cases having considerable thickening of the mucous membrane, polypoid endometritis, and, in general, cases that have resisted long continued local treatment, should be subjected to uterine curettage. The operation, for the sake of thoroughness, ought to be done with the patient under the influence of an anesthetic, and be followed by rest in bed from six to ten days.

Thorough antiseptic preparations should precede the operation (see part I, chap. II). The patient is put either in Sims' left lateral, or in Simon's dorsal position and the cervix grasped by tenaculum forceps. The vaginal entrance is held open by Sims' speculum or vaginal retractors. The cervix is slowly dilated from half to an inch in diameter by means of Goodell's dilator (Fig. 21) and the endometrium systematically removed by means of a medium sharp curette with a copper edge (Fig. 23). As the endometrium is soft, the sharp steel edge of Sims' and Simon's curette is not needed, and is liable to remove the membrane too deeply, or even perforate the uterus. The dull wire curette, however, is useless. The uterine cavity should be gone over a second time with the curette, and douched out with a 1–2000 corrosive mercuric chlorid solution, followed by one of sterilized water. It is then to be swabbed out with strong carbolic acid, or equal parts of carbolic acid and tincture of iodin, or with Churchill's tincture of iodin, by means of an applicator wound with cotton, and then again douched out with sterilized water. Many operators prefer to inject half a teaspoonful of the strong application with a long-nozzled piston syringe (Fig. 19). It is well, as the last step, to pack the uterus and vagina lightly with sterilized gauze (prefer-

ably iodoform gauze) cut into narrow strips. The gauze should be removed in thirty-six hours.

17. If the curettage is done for acute infection, or if the remains of old pelvic disease exist in the pelvis, an ice-bag may be kept on the lower abdomen for thirty-six hours, and opiates may be given for pain.

After the first thirty-six hours the vagina should be douched out twice daily with a 1–2000 solution of corrosive mercuric chlorid, and the endometrium be let alone for two weeks. After that, mild local treatment may be commenced or the case may be allowed to go without any treatment, and report in five or six weeks to ascertain whether the inflammation is disappearing or whether another curetting is required.

If the uterus has been curetted for acute sepsis following abortion, gonorrheal infection, or operations, the gauze must be changed once in twenty-four hours and the uterine cavity douched out each time with a 1–2000 corrosive mercuric chlorid solution, followed by the plain sterilized douche until the pus disappears from the discharge.

The chief danger of the operation is sepsis from a want of perfect aseptic conditions, or from a septic focus already in the pelvis. Laceration of the cervix or uterus from a too rapid and rough dilation increases the dangers by the addition of traumatism, and the opening up of an avenue for the spread of infection to the surrounding connective tissue and peritoneum.

18. In the catarrhal class of cases not due to conditions of the general system or neighboring organs local treatment should be tried.

The first thing to do is to secure uterine drainage. In all cases in which the cervix is too small or contracted at either the external or internal os, it is advisable to pass a sound or bougie before making each application to the endometrium (Fig. 20). This not only drains the uterine cavity, but it stimulates the circulation of the cervix and

lower uterine segment. If the cervix is very small and a flexible bougie or sound cannot be passed without causing too much pain, a small conical tent can be whittled out of a thick piece of slippery-elm bark and used as a dilator for two or three times, or until the sound can be substituted (Fig. 34).

The strictest antiseptic precautions must be observed in sounding or probing the uterus, for the uterine cavity is normally free from pathogenic germs, and the introduction of such germs into it will invariably add to the disease and frustrate all attempts at a cure. The patient should take a vaginal douche before coming to the office. The surgeon should wipe out the vaginal fornices and cervix through the sterilized speculum with sterilized absorbent cotton, and then swab out the parts repeatedly with a five per cent. aqueous solution of carbolic acid. Then the sound should be dipped in the five per cent. carbolic solution and introduced to the fundus without touching anything on its way to the cervix. After this the uterine cavity is swabbed out with the five per cent. carbolic solution if the application to be used for the inflammation be not a reliable antiseptic. The size of the sound should be steadily increased until one as thick as a lead pencil can be passed.

The slippery-elm tent (part I, chap. IV, par. 13) is dipped for a few seconds in the five per cent. solution, then pinched between the teeth of the sterilized dressing forceps to render it flexible, then bent as much as may be desired, then dipped again in the solution, and introduced and left for two or three minutes. It can be followed by a larger one on the same occasion, as its use is not so painful as that of the sound.

19. Until the cervix will allow a No. 10 or 12 sound to pass easily, and without causing blood to appear, a mild application, such as a twenty-five per cent. solution of ichthyol in glycerin, should be applied three times weekly to the endometrium by means of an applicator, wound with cotton and well saturated. When the sound passes easily and with but little pain, stronger applications, such as the tincture of ferric chlorid, tincture of iodin, or a mixture of equal parts of tincture of iodin and carbolic acid, or of carbolic acid and glycerin, may be used.

If the uterus is, or becomes, tolerant of strong solutions, the strong carbolic acid, or strong solution of ferric chlorid, or a twenty-five per cent. solution of zinc chlorid in water may be substituted for the milder applications every second or third time.

When there is any complicating parametritis or perimetritis, glycerin and wool tampons may be introduced at the end of each treatment and allowed to remain until the evening of the next day with material benefit. In such cases hot vaginal douches taken in the recumbent position, and continued for twenty or thirty minutes, are also useful. (Part I, chap. V, par. I).

The vaginal douches should be taken just before retiring at night and in the forenoon, at a time when the patient can lie down for an hour or two.

Pozzi prefers injecting about three gm. (3¾) of the solution into the uterus with Braun's intrauterine syringe. It should not be more than half as strong as those used on the applicator. I can only recommend the method for hospital practice.

In using tampons, I prefer to apply a small cotton tampon thoroughly saturated in glycerin under the cervix, and another tampon of wool under it made very soft and large enough to fill the vagina loosely. A thread should be tied to each to facilitate their removal.

For office treatment, the dorsal-recumbent position with a bivalve speculum is the most convenient method. In hospital practice, Sims' position is preferable, because it enables us better to fill the vagina more evenly.

Intrauterine pencils, or suppositories of cocoa butter or gelatin, containing iodoform, ichthyol, iodol, salicylic acid, thymol, etc., are sometimes used, but they are less reliable in their action than the solutions, and are apt, like the intrauterine injections, to cause painful uterine contractions. When they are made in a mild form, however, containing from five to twenty per cent. of the drug only, one may be used after each treatment to prolong the aseptic condition of the endometrium.

Intrauterine douches of weak antiseptic or astringent solutions, such

as two per cent. solutions of carbolic acid or creolin, or 1–2000 solution of potassium permanganate or corrosive mercuric chlorid, used twice daily, through the dilated cervix, is the best treatment for cases due to recent infection; and even in old cases in which there is a septic discharge they are beneficial after the curetting, or in connection with other intrauterine applications.

20. Success in the treatment depends largely upon a removal of the conditions that cause and perpetuate the disease. Retroversion, retroflexion, and prolapse of the uterus may need correction. Inflammation of the cervix, ovaries, or of the tissues surrounding the uterus, should be treated. The irritation of coitus, onanism, masturbation, lifting heavy objects, running sewing machines, riding bicycles, skating, and the like must be removed. During the menstrual period the patient should give up all regular occupation, and if there be menorrhagia or dysmenorrhea she should keep her bed. General tonics and hygienic regulations are also of great value in restoring these patients to health.

I usually recommend my patients to lie down two hours in the middle of the day, preferably before luncheon, and immediately after taking a hot douche. Massage and general faradization are prescribed for the worst cases. Others are encouraged to take systematic light exercise, such as the Swedish movements, half pound dumb-bell or one pound Indian club exercises, and short walks. These exercises are taken forenoon and afternoon, commencing with the slightest amount, and increasing it gradually and systematically. Many patients improve rapidly while taking the tincture of ferric chlorid with muriatic acid, or the proto-chlorid in pill form with strychnia. (See part 1, chap. v, par. 14.)

CHAPTER IX.

SUBINVOLUTION AND SCLEROSIS OF THE UTERUS.

Synonyms.—*Chronic Metritis. Areolar Hyperplasia.*

1. When the uterus after parturition or abortion does not undergo normal involution, and when after each menstrual period it does not return to its normal intermenstrual quiescent state, certain pathological conditions result which are termed subinvolution, and which may result in sclerosis.

2. **Pathology.** The pathological conditions vary according to the stage. In the early stages there is a general hyperemia and serous infiltration of the uterine walls, and a large number of embryonic elements is found in them (de Sinéty), particularly around the blood-vessels. The endometrium is likewise hyperemic and thickened. In cases occuring after labor the uterine muscular fibers have not undergone the normal amount of retrograde changes, and some are in a state of fatty degeneration. The uterus is symmetrically enlarged and softer than natural. Its cavity measures between three and four and a half inches (8 and 12 cm.).

In the later stages there is an increase of adult connective tissue between the bundles of muscular fibers and around the blood-vessels, which, in time, compresses them and leads to uterine anemia, with atrophy of the muscular tissue. The uterus becomes harder than natural and remains for a long period enlarged, but in time begins to grow smaller as the result of contraction of the connective tissue, and in a few cases becomes smaller than normal.

In cases connected with menstruation, called menstrual subinvolution (Mary P. Jacobi), in distinction from post-

partum subinvolution, there is a greater persistence of the hyperemia (due to its monthly renewal) even after the organization of quite a large amount of connective tissue between the bundles of muscular fibers. The organ increases in size month after month until finally its circulation becomes decidedly restricted, and then, in a hardened state, it remains somewhat enlarged until after the menopause.

The endometrium remains in a state of inflammation until the later stages. The cervix changes to a greater or less extent. It is sometimes twice its former size and the os is widened. The inflammation of the cervical mucous membrane, which so often accompanies it, may give rise to eversion and erosion, the more so if there has been a laceration of the cervix.

In the majority of cases the ovaries and vaginal walls remain congested and infiltrated.

3. **Etiology.** The causes of subinvolution may be grouped under two heads.

(*a*) *Conditions that increase and perpetuate the normal uterine congestion that exists immediately after labor and abortion.* Among these are all causes of puerperal metritis, such as retained secundines, septic inoculation, and laceration of the cervix. Getting up too soon, suppression of the milk, traumatism, coitus, catching cold, etc., after labor or abortion may have a similar effect. A chronic, uncured endometritis predisposes to post-partum subinvolution.

(*b*) *Conditions that induce constant or frequently repeated uterine hyperemia.* Pathological hyperemia interferes with menstrual involution, or the return of the uterus from its state of menstrual congestion and development to the normal intermenstrual quiescent state, and leads to menstrual subinvolution. Among these conditions may be mentioned ovaritis, endometritis, traumatism from too oft-repeated coitus, masturbation, onanism, intrauterine applications, uterine displacements, pelvic tumors, chronic disease of the

pelvic and abdominal viscera, and sedentary habits combined with constipation and laxity of fiber. The continuance of laborious or sedentary occupations during the menstrual period is an important factor in many cases.

4. **Symptoms and Course.** After labor or abortion the first symptoms may be a return of the bloody discharge when the patient gets up; or the menses may return abundantly in two, three, or four months while the child is still nursing, or they may recur too often; or a bloody flow may take place between the periods. There is usually a leucorrhea. At the same time feelings of faintness or weakness in the epigastrium and abdomen, and of pelvic heaviness, may be noticeable when the patient is on her feet. Many or all of the pains of chronic endometritis may be included in her complaints. Anemia is common.

After a few months the hemorrhage and pain diminish, but some discomfort, particularly about the menstrual period, remains. The second stage may run a protracted course, keeping back the menopause, in some cases for several years, during which time the uterus remains enlarged and the symptoms of endometritis persist. In other cases the cicatricial contraction results in a true sclerosis uteri (Skene) with amenorrhea and even a premature menopause.

5. **Diagnosis.** As felt bimanually, the uterus, in the earlier stage of subinvolution, seems enlarged more in its long than in its other diameters, and is slightly softened and somewhat tender. The lower uterine segment does not bulge as palpated through the vaginal walls. The cervix seems enlarged by the increase of solid tissue, and is a trifle softer than the normal. The external os may be slightly widened but is firm, unless cervical endometritis with eversions produce a velvety rim around it. In post-

partum cases the vagina and vaginal entrance are relaxed and enlarged, and the uterus in the majority of cases is rather low in the pelvis. As seen through the speculum, the cervix is purplish, but, except for a short time after labor or abortion, the vaginal membrane is but little darker in color than natural.

In cases of long standing the uterine tenderness diminishes, the walls become hard, the cervix pale in color, and as sclerosis supervenes the body becomes somewhat flattened. The cervical mucous membrane is drawn in (Skene), and exceptionally the entire uterus becomes smaller than natural.

Inflammatory exudates with septic foci in the pelvis, and chronic endometritis, may prolong the congestion almost indefinitely. The color of the cervix will then continue to be deep, and the uterus may be held high in the pelvis instead of sagging low down.

Pregnancy between the eighth and fifteenth weeks might be mistaken for the earlier stages of post-partum involution. Bimanually the pregnant uterus feels enlarged in its lateral and antero-posterior more than in its long diameter, is very decidedly softened, and not tender. The lower uterine segment in most cases is felt to bulge somewhat as the vaginal finger presses up along the anterior or lateral walls. The cervix does not seem so much enlarged, is relaxed, and decidedly softened deep into its substance. The cervix, the vagina, and often the vulva are of a purplish color. Symptoms of pregnancy are seldom entirely wanting.

6. **Prognosis.** The prognosis is in the earlier stages favorable, but becomes more and more unfavorable as the disease becomes chronic until the stage of sclerosis supervenes, when a cure can no longer be expected. However, the symptoms subside after the menopause, when a state of sclerosis may be said to approach somewhat that of the normal condition of the uterus. Pregnancy seldom cures

such cases. Death does not result from uncomplicated subinvolution.

7. **Treatment.** Cases discovered within a few weeks after delivery or abortion require rest in bed, the correction of any uterine displacement that may be present, the interdiction of coitus, and, if no acute pelvic inflammation be discoverable, the administration of half a teaspoonful of fluid extract of ergot three times daily. If secundines have been retained their removal is of first importance.

Hot vaginal douches twice or three times daily at a temperature of 110° to 120° F., taken while on the back and continued for twenty minutes, are decidedly beneficial in this very early stage. One or two drams, four to eight grams, of blood should be removed from the cervix twice or three times a week by scarification, and a pledget of cotton saturated in boiled glycerin be placed against the cervix and allowed to remain for twelve hours. Tincture of iodin should be painted over the abdomen twice daily until the skin becomes tender, and be reapplied as soon as the irritation produced by it subsides.

After lying abed for about two weeks, the patient may be allowed to sit up for a portion of each day, if such does not cause hemorrhage or pelvic discomfort. From this time, endometritis or any other kind of pelvic inflammation discoverable should be systematically treated. In addition to such local treatment, the vagina should be loosely tamponed during the daytime, three or four times weekly.

The best way to tampon the vagina in such cases is to place the patient in the left lateral, or the knee-chest position, introduce Sims' speculum, and allow the uterus to sink away from the vaginal entrance. Then after wiping away all the vaginal and cervical mucus, and thoroughly swabbing out the vaginal fornices and cervix with a five per cent. solution of carbolic acid, a pledget of cotton thoroughly saturated with glycerin is placed against the cervix, and

the vagina loosely packed with pieces of cotton wool, whose fibers have been drawn wide apart to make it soft. A piece of thread should be attached to each piece that the patient herself may remove at bedtime those that were introduced in the morning. (See part I, chap. IV, par 9, Vaginal Tamponade.)

8. In the early stages of menstrual subinvolution uterine displacement is to be corrected, coitus restricted, and the patient to keep her bed during the menstrual flow. Her daily habits should be regulated, and the endometrium treated, as recommended for chronic endometritis. The cervix should be scarified twice or thrice weekly, and glycerin and wool tampons be applied each time, leaving them from one morning until the evening of the next day.

The same treatment is indicated for cases connected with disease of the uterine adnexa and pelvic peritoneum, except that care must be taken not to irritate the endometrium nor to pack the vagina so tightly as to press upon tender parts.

9. In the more chronic cases the treatment must be a stimulating one, in order to promote uterine contraction, and if possible absorption of as much of the foreign tissue as possible. Strong carbolic acid, liquor ferri chloridi, the solution of acid nitrate of mercury, or one part of zinc chlorid in two of water, may be applied to the endometrium once a week, if they do not cause pelvic pains that persist between the applications. Electrolysis in dosage to produce mild cauterization, 50 to 75 milliampères, using the negative pole within the uterus, promises much. If there is menorrhagia, the positive pole is used within the uterus until that symptom disappears.

Cervical lacerations should be repaired, and if the sub-mucous tissue be much diseased, the cervix should be amputated after Schroeder's or Simons' method. (See part 4, chap. V, par. 11, Figs. 96, 97, and 137.)

The internal administration of iodin or mercury for the purpose of producing absorption can do nothing but harm, except in recent cases connected with plethora, or a rheumatic or gouty condition.

CHAPTER X.

SALPINGITIS AND ITS COMPLICATIONS.

ANATOMY OF THE FALLOPIAN TUBE.—PELVIC PERITONITIS.—ABSCESS OF THE OVARY.

1. **Anatomy.** The Fallopian tubes are about four inches (10 cm.) in length, and extend from the uterus outward, curving around the ovary and opening into the peritoneal cavity through the ostium abdominale. They are about as

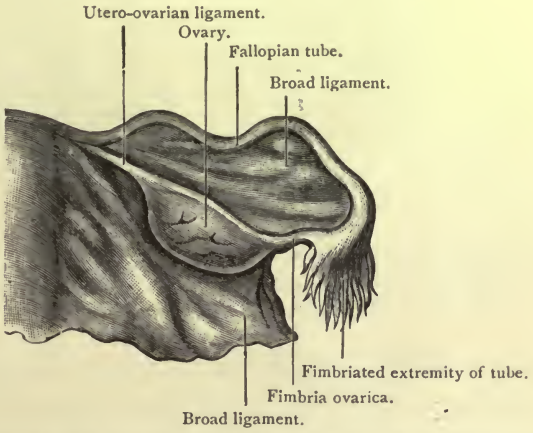

FIG. 159.—FALLOPIAN TUBE AND OVARY, SEEN FROM BEHIND. (*After Morris.*)

large around as a slate-pencil ($\frac{1}{12}$ inch, or 2 mm.) at the uterine end, and gradually increase in size to the abdominal end,

where they are nearly three times as large in diameter (¼ inch, or 6 mm.). The outer portion is called the ampulla, the inner portion the isthmus, and the fold of broad ligament by which they are held the meso-salpinx.

The walls of the tube are continuous with the uterine walls and consist of an external or serous coat, a middle or muscular, and an inner or mucous coat which projects beyond the ostium abdominale in the shape of fimbriæ. The fimbriæ form the infundibulum which is supposed to be applied to the ovary during menstrual erection. At the

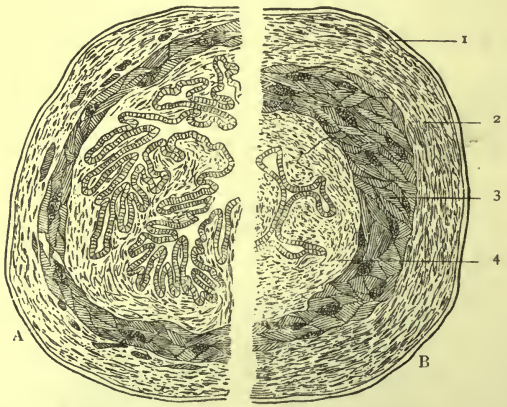

FIG. 160.—NORMAL FALLOPIAN TUBE. (*Wyder.*)

A. Enlarged section from the ampulla, showing the folding of the mucous membrane and thinness of the walls. B. Section from near the uterus, showing small size of the lumen and thickness of the walls. 1. Serous coat 2. Connective tissue supporting the serous coat. 3. Muscular coat. 4. Connective tissue supporting the epithelium.

uterine end the muscular wall is thick, the lumen small, and the mucous membrane smooth and slightly folded in a longitudinal direction. As the tube increases in size toward the abdominal ostium, the walls become thinner and more vascular, and the longitudinal folds of mucous membrane more abundant. This complicated system of folds, or plicæ,

and recesses seem to take the place of glands. (Bland Sutton.) The epithelium is of the cylindrical variety, with cilia which wave toward the uterine end, and is supported by embryonic connective tissue. It secretes a thin mucus.

The muscular layer is made up mainly of circular unstriped fibers surrounded by a thin layer of longitudinal fibers. Longitudinal and circular fibers may be traced into the folds of the mucous membrane. The serous coat is connected with the muscular by means of loose connective tissue containing the blood-vessels, and ends abruptly with the circular layer of muscular fibers at the ostium abdominale. Occasionally one or more accessory ostia are found.

Lymphatic vessels in large numbers connect the tubes and uterus with the ovary, but connect the uterus with the Fallopian tubes much less abundantly.

The course of the tubes is somewhat tortuous, the more so if they are poorly developed or in a state of subinvolution (Haultain), conditions which favor constrictions of their lumen, and cystic accumulations.

2. **Classification.** Salpingitis and its results may be classified as follows :—

Catarrhal, Purulent, and Interstitial Salpingitis.

Cystic Degeneration of Tube and Ovary.	Pyosalpinx, Hydrosalpinx. Hematosalpinx. Tubo-ovarian abscess. Tubo-ovarian cyst. Ovarian abscess. Atrophy.

Pathology. *Catarrhal salpingitis* is generally unilateral and accompanied by more or less general enlargement of

the tube, up to the size of the thumb, as well as by a slight increase in its tortuosity. The entire wall is thickened, softened, and injected, but much more so in the mucous coat, which is infiltrated with round cells and moistened with mucous secretion. The ostium abdominale at first is patulous, but as the serous coat becomes infiltrated it extends over the fimbriæ to a variable extent, and, contracting upon them, folds them up.

The normal folds of mucous membrane are swollen, and secondary ones are developed on their sides. They are in places agglutinated, enclosing spaces among them and giving the appearance of glandular formation. The epithelium as a rule retains its integrity, but both the cells and nuclei are somewhat enlarged.

The mucus usually discharges through the uterine orifice, and, if the accompanying endometritis does not continue in a severe form and initiate new attacks, the tube may recover its normal condition.

FIG. 161.—SALPINGITIS WITH PELVIC PERITONITIS AND ADHESIONS POSTERIOR TO THE UTERUS. (*Heitzmann.*)

In some cases a few drops of mucus escape through the abdominal ostium and cause a localized evanescent peritonitis with slight effusion and temporary frail adhesions. These discharges into the peritoneal cavity may take place many times, giving rise to recurrent attacks of pelvic peritonitis.

4. In *purulent salpingitis* the walls of the tube are more

extensively infiltrated, and its course is often so tortuous as almost to divide it into compartments.

The mucous membrane is bathed in pus or a muco-pus. Its folds are swollen, as in the simple variety. The epithelial cells lose their cilia and are enlarged and compressed out of shape. The membrane is exceedingly vascular and packed with small cells, which also invade the other coats. Usually some exudate appears on the serous surface forming adhesions with the surrounding surfaces. A localized peritonitis, due to the dripping of pus from the abdominal

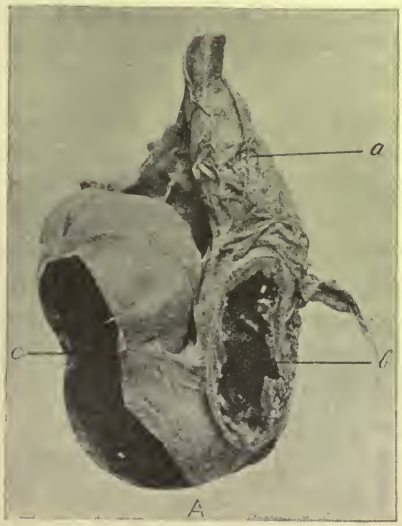

FIG. 162.—PYOSALPINX. (*Freeborn.*)

A. Left tube. *a*. Uterine end of tube covered with adhesions. *b*. Longitudinal section of the tube at its middle portion. *c*. Cyst of the fimbriated end.

end (Tait), agglutinates the fimbriæ and ostium to the ovary and posterior surface of the broad ligament. In some cases the swollen serous and muscular coats sooner or later extend entirely beyond the fimbriæ, and the ostium is closed over

them, so that, if not destroyed, they lie folded up within, and are invisible when the tube is exposed to view. The uterine orifice is tightly filled by the swollen folds of mucous membrane, but is not impermeable.

In the beginning the disease is usually confined to one side, but is apt, after a time, to affect the other. The peritonitis, owing to repeated escapes of pus from the tube, may extend to the entire pelvic cavity, agglutinating the pelvic organs, omentum, or even the intestines, and infiltrating the connective tissue quite generally. Accumulations of pus or serum between the adhesions are occasionally found, sometimes displacing the uterus laterally or forward. In severe cases the condition is practically the initiatory stage of interstitial salpingitis.

In recent cases the gonococcus is the most common germ present, although the staphylococcus aureus and albus, or streptococcus, may be present, either with or without the former. The gonococcus produces the mildest, the streptococcus the severest forms of peritonitis.

5. *Interstitial salpingitis* represents an advanced stage of purulent salpingitis, and usually affects both sides. The walls of the tubes are thickened, hardened, and purplish in color. Sometimes the induration is general, and sometimes it is more marked in places, giving a nodular character to the tube. The ostium abdominale is nearly always closed, but the uterine orifice is more or less pervious. The mesosalpinx may be expanded by the enlarged tube, or it may be held folded upon itself by adhesions, or it may be extensively infiltrated by inflammatory products (Savage). (See chap. XII, par. 2, Fig. 170.) The tube and the ovary are adherent on the posterior surface of the broad ligament over or beside the sacro-uterine ligament, or in the cul-de-sac of Douglas.

The peritoneal adhesions which may involve the omen-

tum and intestines are usually organized, and so firm in some cases that they cannot be broken up without laceration of the peritoneal surfaces, or even walls, of the viscera. Organized bands may extend between the surfaces in all directions, and it is sometimes difficult, when the abdomen is opened, to determine the relation of the parts of the tumor-like mass thus formed. (Fig. 161.)

The mucous membrane is dark blue in color, the villi enlarged, united, and partly destroyed by small-celled infiltration. False glands and cystic spaces are thus produced at some distance below the surface. A small amount of muco-purulent secretion is often found on the tube.

The muscular tissue of the walls is in part destroyed and replaced by an abundance of young connective tissue cells. When the uterine orifice is pervious the muscular coat may, however, be hypertrophied.

6. *Pyosalpinx* signifies an accumulation of pus in a closed or cystic Fallopian tube. There is usually an increase in its size and an attenuation of a portion or all of its walls. It is an advanced stage of purulent and interstitial salpingitis in which the abdominal opening is obliterated by inflammation, and the uterine opening practically closed by the extreme torsion of the tube or by inflammatory thickening of the walls. As a result of the pressure of the accumulated fluid some of it may, however, occasionally escape into the uterus.

The pus may be mixed with blood, serum, or mucus. The accumulation is usually in the ampulla, giving the tube the shape of a gourd or pear; but it may occur as two or three separated collections in different portions; or it may distend almost the entire tube, giving it a sausage shape. The size of the cyst varies from slightly above normal to that of a child's head, but is seldom more than 5 cm., or

two inches, in diameter. The walls about the enclosed fluid are thinner and more friable than in interstitial salpingitis and are more liable to rupture, particularly on its posterior surface. The mucous membrane presents changes similar to those of septic salpingitis, but in old cases more or less atrophy takes place.

The adhesions and changes in the pelvic peritoneum are similar to those of interstitial salpingitis, as are also the changes in the walls of the uterine end or isthmus. Acute attacks of peritonitis, due to extension of inflammation through the walls of the tube, are common, adding fresh exudate each time.

Rupture of the tube into the rectum is a frequent occurrence. Rupture into the bladder may also take place. In some instances the distended tube separates the layers of the mesosalpinx, and is partly surrounded by the pelvic connective tissue, and may then rupture into the broad ligament and give rise to a pelvic cellular abscess, which in turn may rupture into the vagina or rectum. Rupture into the peritoneal cavity occurs very rarely. Nearly all the escapes of pus into the peritoneal cavity are through the ostium abdominale from non-cystic tubes.

7. *Hydrosalpinx* is usually an advanced stage of pyosalpinx. The adhesions are in part absorbed and drawn into membranous shreds, the tubal walls are attenuated and translucent, and the mucous membrane atrophied. The germs in the pus have become destroyed, and the pus has become absorbed or replaced by a serous fluid, which is sometimes tinged with blood. The size and shape vary, as in cases of pyosalpinx. Axial rotation, or a twisting of the undilated portion of the tube on the long axis, with effusion of venous blood within the cyst, giving the fluid a chocolate color, has been noticed in some instances.

[*] The change of pelvic pus into serum was first described and demonstrated by Wm. H. Byford ("Transactions of American Gyneco-

logical Society," 1883). From his observations and those of Bixby (*ibid.*, 1877) it would seem probable that hematosalpinx may also be converted into hydrosalpinx. In some cases of hydrosalpinx a small collection of pus is found nearer the uterus, or pyosalpinx is found near the uterus and hydrosalpinx at the other end.

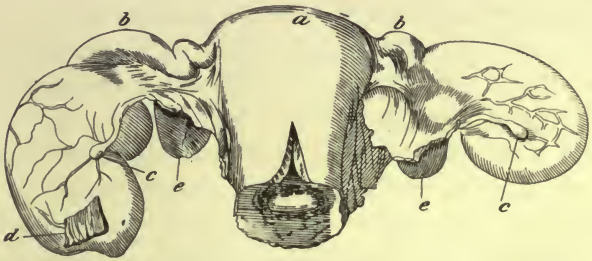

FIG. 163.—DOUBLE HYDROSALPINX. (*Hennig.*)
a. Uterus. *b*, *b*. Fallopian tubes. *c*, *c*. Dilated portion of tubes. *d*. Remnant of adhesion. *e*, *e*. Ovaries.

FIG. 164.—DOUBLE HYDROSALPINX AND CYSTIC OVARIES. (*McMurtry.*)

The author observed a case of double hydrosalpinx the size of a small adult head and a cocoanut, respectively, as the result of obstruction of the uterine openings in a case of cystic uterine fibroid. The tubal walls were hypertrophied.

Hydrosalpinx is said to be intermittent when the contents occasionally escape through the uterus, and the tube afterward refills.

8. *Hematosalpinx* may be divided into two kinds, the spurious and true.

Spurious hematosalpinx is an effusion of blood into the normal or inflamed tube during menstruation or catarrhal inflammation, or as the result of mechanical interference with the tubal circulation by pelvic exudates, displacement of the tube, etc. The blood escapes into the uterus or is absorbed, or may flow into the abdominal cavity and produce a pelvic hematocele.

True hematosalpinx consists of an accumulation of blood in a *cystic* tube, and thus almost always follows a pyosalpinx or a hydrosalpinx, as a result of traumatism, twisting of pedicle (Veit), etc. If the proportion of blood is small it remains fluid, if large it coagulates and undergoes more or less organization or becomes thick and tarry, and in some instances possesses septic qualities. The walls of the tube resemble those of pyosalpinx, or, occasionally, those of hydrosalpinx. A true hematosalpinx is sometimes observed in connection with uterine fibroids.

A mere coloring of the pus or serum of pyo- and hydrosalpinx does not constitute hematosalpinx. A tubal pregnancy does not produce a hematosalpinx unless the ostium abdominale becomes occluded. A resumption of activity of septic germs, or a reinfection, may reconvert a hematosalpinx into a pyosalpinx. Retention of menstrual fluid in the tube, due to genital atresia, will be considered as merely a part of hematometra and not as a true hematosalpinx.

9. A *tubo-ovarian abscess* is a pyosalpinx communicating with an abscess of the ovary. The ovarian abscess lies in contact with the tube, and ulceration and perforation take place in the adherent walls between them. The opening is small, and is seldom at the site of the ostium abdominale (Bland Sutton). The pathological conditions otherwise are those of pyosalpinx. A tubo-ovarian abscess may, how-

ever, be formed by an adhesion of the fimbriæ of a suppurating tube to the ovary, the latter becoming part of the wall of the resulting pyosalpinx. The ovary becomes infected (par. 11) and ovarian abscesses may form which destroy the ovary and rupture into the cavity of the tube.

10. *A tubo-ovarian cyst* is a hydrosalpinx connected by a small opening with an ovarian cyst. Usually the ovary is entirely converted into a cyst, which probably represents an old abscess of the organ. The general appearance and pathological conditions are the same as those of hydrosalpinx.

When the communication between the cysts is through the ostium abdominale, Bland Sutton, basing his views upon Arthur Robinson's investigations of the ovaries of animals, calls it ovarian hydrocele, the walls of the ovarian portion being made up of a peritoneal sac derived from the broad ligament, and which contains or involves the ovary.

11. *Pathological changes in the ovary* are such constant and important concomitants of all forms of salpingitis as to require special mention.

As a result of inflammation, the tunica albuginea becomes thickened and sclerotic, preventing the rupture of the follicles and the full development of the ovules. The follicles are represented by small serous cysts, some of which may coalesce and form larger ones, and even the ovules themselves may become dropsical (cystic ovaritis). The ovary may be more or less filled with these cysts, or it may be considerably enlarged by a preponderance of interstitial inflammation, with proliferation of connective tissue and atrophy of the glandular portion. Effusion of blood into one or more of the cysts occurs, distending them with a thick, bloody fluid, or forming in them organized blood

clots from the size of a mustard seed to that of a hen's egg. A jagged, yellowish, fibrous wall forms around the larger clots, and may remain as a collapsed corrugated membrane after the blood clot has become absorbed. Minute interstitial hemorrhages about the blood-vessels are often found (Fig. 165).

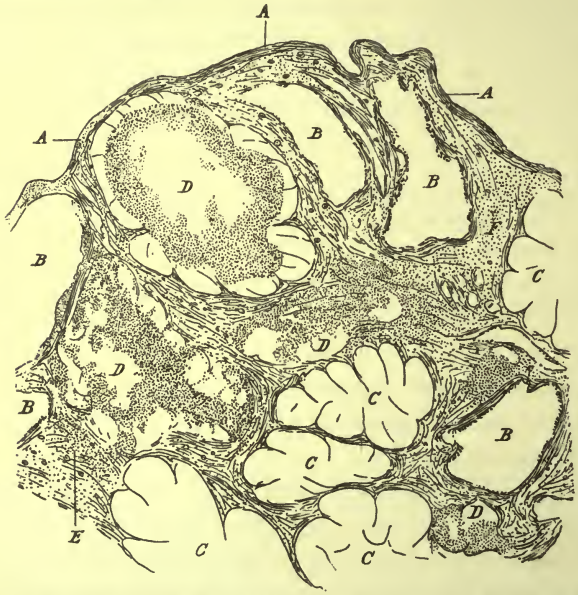

FIG. 165.—CHRONIC OVARITIS OF PERIPHERAL ORIGIN.—30 diameters. (*Petit and Bonnet.*) *AA.* Sclerosis of the tunica albuginea. *BB.* Follicular cysts. *CC.* Corpora lutea undergoing hyaline degeneration. *DD.* Same invaded by hemorrhage. *D'.* Corpus luteum transformed into a blood cyst. *EE.* Interstitial hemorrhages. *F.* Connective tissue undergoing sclerosis.

Purulent infection of the ovarian follicles sometimes takes place, either as a result of escape of pus from the ostium abdominale, or from the adhesion of a pyo-salpinx to the ovary, or in rare instances from the transmission of germs from the tubal or uterine walls along the lymphatics.

Some of the cysts in the ovary become infected, these in turn infect other cysts, many of which coalesce and form an ovarian abscess of varying size.

In some cases the tubal inflammation subsides and almost disappears, while the ovarian suppuration continues. The pus may go on invading new areas until the entire ovary is converted into a pus sac surrounded by adhesions, and may then discharge into the rectum, vagina, connective

FIG. 166.—SUPPURATING CYST OF THE OVARY AND SUPPURATING SALPINGITIS. (*Freeborn.*) *a*. Enlarged and tortuous tube, its surface covered with adhesions. *b*. External surface of the cyst of the ovary. *c*. Wall of the cyst. *d*. Lining membrane of granulation tissue.

tissue, or peritoneal cavity. In many cases the pus loses its virulence and remains encysted throughout the lifetime of the patient, ever ready, however, to reassume septic irritative qualities upon the occurrence of an adequate exciting cause.

12. *Atrophy* of the tube may result from the destructive action of pelvic suppuration. After the partial atrophy of

the walls by cystic degeneration, a rupture and discharge of the contents may be followed by cicatricial contraction and partial obliteration. Traces of mucous membrane and muscular fibers may be left, but the main part consists of connective tissue that has contracted to such an extent as to resemble a fibrous cord.

According to Boldt, atrophy of the tube may result from interstitial salpingitis, without cystic degeneration. (*Am. Jour. of Obst. 1888.*)

13. **Etiology.** In nearly all cases salpingitis is caused by an extension of inflammation from the mucous membrane of the uterus, hence all causes of endometritis may become causes of salpingitis. Gonorrheal and puerperal endometritis are the most common ones. Laceration of the cervix or vagina through into the connective tissue may lead to infection of the ovary or tube by way of the lymphatics.

Eruptive fevers and syphilis may be mentioned as occasional causes. Papilloma, tuberculosis, cancer, may act as causes, but these conditions will be discussed elsewhere.

14. **Symptoms and Course.** *Acute catarrhal salpingitis* usually occurs in patients already exhibiting symptoms of endometritis. Moderate pain and tenderness in the lower abdomen a little to one side of the median line, some backache and scattered neuralgic pains over the body, a slight rise in temperature, 99½° to 101° F., and perhaps an increase in the amount of leucorrhea are the most noticeable. If the menstrual flow comes on it is usually profuse.

A bimanual examination reveals tenderness and fullness on one side of the uterus, and some pain when the uterus is moved or displaced by the finger.

If the patient keeps quiet the pain disappears and the tenderness subsides in three or four days, and the recovery may be rapid.

In some cases a few drops of mucus may escape through the ostium abdominale and cause an acute pain in the corresponding iliac region, local tympanites, a temperature of 101° or 102° F., a hard, full pulse, and sometimes nausea. These symptoms are often the first to attract attention. The patient then recovers more slowly, and a small pelvic exudate may, for a few days, be felt beside or behind the uterus after the tenderness has somewhat subsided.

15. The symptoms of *purulent salpingitis* engrafted upon a chronic, or a gonorrheal, endometritis may be similar to those of the catarrhal form, but they are a little more pronounced in character and slower in subsiding.

When pus spills through the ostium abdominale the peritonitis may not be much more severe than when mucus escapes (par. 14), for only a drop or two may have escaped, and gonorrheal pus does not affect the peritoneum as badly as other kinds. In some cases, however, particularly when there is a mixed infection, the escaping pus causes an extensive pelvic peritonitis, with great tympanites, high temperature (102° to 104° F.), rapid pulse (100 to 120), extreme pelvic radiating pains, and an abundant peritoneal and cellular effusion that becomes hard and board-like, and partly or entirely fills the pelvis. It sometimes extends above the pelvic brim between the intestines or in the omentum, where it can be felt by abdominal palpation. The exudate is usually resonant upon percussion. These symptoms will last for many days, and the patient may be confined to the bed for two, three, or even seven or eight weeks.

She may then entirely recover, as far as her symptoms are concerned, for a few weeks, or months, or even years, when, after a season of over-exertion, exposure to cold, or sexual excesses, more particularly at the menstrual period, she will be taken with a similar attack of (recurrent) peritonitis. The

exudates have been observed to appear and disappear with remarkable rapidity during these acute attacks.

In many cases the symptoms do not subside completely. (See par 16.)

When the attack results from direct infection during or after abortion or operative procedures, chills, exacerbations of fever, sweating, and the other symptoms of general infection predominate. The temperature, within forty-eight or seventy-two hours, may reach 104° or 105° F., rising and falling three or four degrees once or twice daily, being highest in most cases in the afternoon or early evening. The pulse ranges from 100 to 140. The pain may be severe, but often it is noticeable by its absence, even when the abdomen is distended and the pelvic peritoneal cavity filled with pus. General peritonitis and abdominal distention, labored respiration, a thready pulse, persistent vomiting of a dark-green fluid, and mental anxiety or delirium may supervene and end in death.

A vaginal examination reveals an enlarged, sensitive uterus surrounded by tender, infiltrated tissues in which a hard mass may or may not be found. Abdominal palpation reveals a tender exudate extending from the enlarged uterus, or perhaps only tympanites, or, in rare instances, nothing abnormal except deep-seated tenderness.

16. The symptoms of *interstitial salpingitis*, *pyosalpinx*, and *tubo-ovarian abscess* usually extend over a long period of time. There may be a history of a single acute attack, or of recurrent attacks, of pelvic peritonitis with intervals of good health, or, more often, intervals of semi-invalidism, during which the patient is more or less incapacitated by pelvic pain from the ordinary duties and enjoyments of life. When pus is present there is apt to be a daily afternoon rise of temperature to 99° or 100° F., or even higher.

Between the attacks the symptoms of endometritis are seldom absent. A burning pain in one or both iliac regions, that may radiate to the lumbar, gluteal, or sciatic region, is one of the most constant. Dysuria, painful defecation, increase of pains after physical exertion, dyspareunia, dysmenorrhea and intermittent or constant leucorrhea are prominent. After the disease has lasted a long time, and the septic influences have disappeared, or have become less pronounced, the menses may be of normal amount but delayed ; or they may drag along for a few days beyond the period ; or amenorrhea and a premature menopause may supervene. Sterility is the rule.

Sympathetic congestion of the mammary glands, nausea, dyspepsia, hysteria or neurasthenia may add an unpleasant variety to the clinical picture.

A physical examination reveals enlarged, hard, tender masses behind or beside the uterus, or high up on one or both sides of the uterine horns, that restrict or abolish its mobility, or fix it in one side of the pelvis. The discharge sisuing from the cervix may be a thick, exceedingly tenacious mucus, or a muco-pus.

The uterus is usually in a state of subinvolution or general metritis.

17. The symptoms of *hematosalpinx*, *hydrosalpinx*, *tubo-ovarian cyst*, and *atrophy* of the tube are similar to those of pyosalpinx, but are usually of the less pronounced kind. They are noticeable for their chronicity.

These cysts feel more elastic to the vaginal touch, and do not immobilize the uterus so thoroughly. When the tube is atrophied restriction in the mobility of the uterus, and small, hard, irregular nodules or ridges on the posterior surfaces of the uterus and broad ligaments, are usually found upon examination. The uterus is apt to be retroflexed.

CHAPTER XI.

SALPINGITIS AND ITS COMPLICATIONS (*Continued*).

Oophorectomy, Vaginal and Abdominal Hysterectomy for Diseased Appendages.

1. **Diagnosis.** The ordinary physical signs have been given with the symptoms.

Appendicitis is distinguished from salpingitis by the high position of the exudate, the abdominal rather than pelvic seat of pain, the greater tendency to nausea, the relation of the attacks to stomach and bowel disorders, and the absence of any relation to the functions or conditions of the genital organs.

The exudate of *pelvic cellulitis* is usually low down in the pelvis, is fused with the walls of the cervix, and extends toward the walls of the pelvis, either laterally along the vesico-vaginal septum, or around the rectum, and is as a rule unilateral. *Enlarged tubes* leave a sulcus between their lower and anterior borders and the uterine walls as felt per vaginam, and if low down extend from the uterine cornua down behind the cervix rather than beside it. The condition is usually bilateral.

In young girls it should be remembered that pelvic inflammation is apt to depend upon genital tuberculosis or an inflamed dermoid cyst. In the former the condition comes on gradually and without apparent cause, and is usually associated with tuberculous deposits elsewhere. In the latter a single adherent globular tumor is felt

2. *Pyosalpinx*, *tubo-ovarian abscess*, and *ovarian abscess*, particularly if the uterus be enlarged and hardened by interstitial metritis, may be mistaken for a fibroid in the broad ligament projecting from the lateral uterine wall; or the uterus and inflammatory mass may be so united that

the whole simulates a fibroid uterus. But the history of inflammation, the restricted mobility and tenderness of the tumor, and the dark-colored, congested cervix indicate its inflammatory nature.

Ovarian papilloma or *cystoma* developed among previously adherent uterine appendages or in the broad ligament cannot always be differentiated. However, the gradual progressive augmentation of pain and increase in size sometimes aid in the diagnosis.

A *pedunculated intraperitonial fibroid* is hard, insensitive, and can usually be traced to the uterine walls. The adnexa are found on either side.

3. *Hydrosalpinx* and *tubo-ovarian cyst* may be mistaken for a small ovarian tumor or parovarian cyst and tubal pregnancy. See diagnosis of ovarian tumors (part 9, chap. VI, par. 11).

A *parovarian cyst* is softer and has no traceable connection with the uterus, and no adhesions. The ovary can sometimes be felt.

A *cyst of the broad ligament* is soft and fills the broad ligament flush with the uterus, has no pedicle, and lies under or in front of the ovary.

Tubal pregnancy is distinguished by the accompanying symptoms of that accident (part 10).

Anesthesia is usually necessary to render these distinctions apparent.

4. *Hematosalpinx* feels like a pyosalpinx with but few adhesions, or like a small hydrosalpinx with adhesions. It is oblong, slightly fluctuant, is more or less constricted in places, and can be traced to the uterine horn. It is usually unilateral.

5. *Atrophy of the tube* may be suspected when there has

been a long history of pelvic inflammation and sterility, and an ill-defined or only a small exudate on the posterior surface of the broad ligament. The fundus uteri is often drawn back and held by adhesions. The tube can sometimes be felt as a hard cord adherent beside the uterus or behind the broad ligament. There may be but little tenderness in the pelvis and but few symptoms.

6. **Prognosis.** *Catarrhal salpingitis* frequently ends by a restoration of the tube to an approximately normal condition. The disease is, however, apt to be reproduced by the accompanying endometritis, and a destruction of the cilia may follow, or a purulent salpingitis be established. Sterility may result if both sides are affected.

Purulent salpingitis may endanger life through the escape of a large quantity of pus through the ostium abdominale, and a consequent general peritonitis, or abscess formation. In many cases it runs into the interstitial form. There is generally prolonged sterility, with a liability to the occurrence of ectopic pregnancy.

Interstitial salpingitis usually means chronic invalidism of mild or severe form. In some cases it involves all of the danger, and exhibits all of the obstinacy, of pyosalpinx, in others a gradual improvement of both the local and general symptoms, a recovery from septic conditions and a final restoration of the patient's strength and activity.

Pyosalpinx, *tubo-ovarian abscess*, and *ovarian abscess* are practically incurable, except by operation or evacuation of the pus or other fluid through one of the viscera, or externally through the skin. However, the virulence of the pus may diminish and the adhesions become absorbed, and the patient recover a fair degree of health as long as she takes proper care of herself.

In other cases the activity of the septic conditions, aided

by external influences, is attended by repeated attacks of peritonitis. The patient is bedridden a large part of the time, and is in constant danger of rupture of the tube and fatal peritonitis, or pelvic abscess or fistulæ, and progressive deterioration of the general health. Even after removal of the adnexa the patient may not regain health and freedom from pain for many months on account of disease remaining in and about the uterus. An infected stump sometimes perpetuates the inflammation after such an operation.

Hematosalpinx, *hydrosalpinx*, *tubo-ovarian cyst*, and *atrophy* of the tube may under favorable circumstances give but little trouble, but, on the other hand, may continue as a permanent annoyance to the patient. They seldom endanger life.

7. **Treatment.** As the disease is usually the extension of an endometritis, and as one tube is affected first, much may be done in the way of prophylaxis. Acute metritis following labor, abortion, or operations should, as soon as diagnosed, be treated by curettage and a thorough disinfection or mild cautery of the endometrium with strong carbolic acid. Subsequently antiseptic vaginal douches should be given every six or eight hours, and, if the symptoms persist, intrauterine douches every twelve hours. The same treatment is applicable to gonorrheal endometritis. (Pryor.)

After operations upon the uterus in the presence of septic conditions, an ice-bag kept over the lower abdomen for twenty-four or thirty-six hours is useful in limiting the reaction and thus in preventing the development of sepsis.

8. *Catarrhal salpingitis* calls for complete rest in bed, and measures to favor drainage of the uterus and tube and diminish pelvic congestion. Hot fomentations continuously applied relax the uterine muscle and favor drainage, while saline cathartics and hot vaginal douches diminish the con-

gestion. Eight grams, or two drams, of magnesium or sodium sulphate may be taken every two hours until three or four liquid stools are produced. At the first evidence of action of the laxative, an enema consisting of two tablespoonfuls of glycerin to six of water should be used to unload the sigmoid flexure. After that the saline is given once or twice in twenty-four hours, as may be requisite to produce a couple of liquid stools daily. The douches, commencing at a temperature of 105° F. and gradually raised to 115° or even 120° F., should not be used until the symptoms begin to subside, and then should be given on a bed-pan with a waste tube, and with as little disturbance of the patient as possible. After the acute stage has passed turpentine stupes or the tincture of iodin may be applied over the lower abdomen as a counterirritant.

The administration of morphia to insure quiet and relieve pain or discomfort may be beneficial. Decided septic symptoms call for alcoholic stimulants. When severe peritoneal symptoms are present, vaginal douches and all manipulations that interfere with absolute quiet should be avoided.

The same treatment is applicable to *purulent salpingitis* at the outset, with the addition of intrauterine douches every eight or twelve hours of a 1–3000 solution of corrosive mercuric chlorid followed by a douche of sterilized water, provided no peritoneal symptoms be present.

The patient should be kept in bed until the temperature remains normal during the twenty-four hours, and the tenderness has greatly diminished or disappeared. Then she may be allowed out of bed, but should lie down from two to three hours in the middle of each day, and remain in bed during the menstrual period. Sexual intercourse should be prohibited. Antiseptic vaginal douches, occasional

saline laxatives, and counterirritation over the lower abdomen should be continued. These restrictions should be kept up for weeks or even months in case there be any signs of tubal disease remaining, for it is only in this way that recurrent attacks can be avoided and the absorption of exudates be secured.

9. *Local treatment* is not well borne in some cases but in others is decidedly beneficial. It should be made three times a week. The cervix is kept dilated with sounds under antiseptic precautions, as recommended elsewhere for endometritis (chap. VIII, par. 18), and the uterine cavity disinfected by swabbing it out with a mild but efficient antiseptic. If the cervix appear much congested it should be scarified each time. A 25 per cent. solution of ichthyol in glycerin answers well as an intrauterine application. Then a small tampon of cotton saturated in glycerin, or in a 10 per cent. solution of ichthyol in glycerin, is placed against the cervix and a dry wool tampon under that, large enough to loosely fill the vagina and act as a support to the inflamed structures, but not large enough to cause discomfort. If the patient bears the treatment well, the cervical cavity should each time be swabbed out with the tincture of iodin.

When the case has become chronic and there is but little tenderness, and no signs of pus, in the pelvis, electricity favors the absorption of the exudate. Mild doses, 25 to 40 milliampères, are as large as it is usually safe to use. If the adnexa are in the recto-uterine pouch, a vaginal electrode (25 milliampères) should be used, if situated higher up an intrauterine electrode may be tried.

Pelvic massage, according to Thuré Brandt, is beneficial in the same class of cases.

It has been recommended to drain the tube by dilating the uterine horn by a catheter or sound (Walton), or by packing the uterine horn

with iodoform gauze, changing the packing daily (Dorsett). By the first method the tissues may be injured; by the second, an acute attack of purulent salpingitis may be produced. Their value and safety have not yet been established.

While the patient is thus restricted as to exercise, her diet must be regulated, the secretions kept in order, and the general circulation be stimulated by general massage, electricity, and selected Swedish movements.

It is sometimes possible, in this class of cases, to break up the adhesions whilst the patient is anesthetized. The organs are grasped between the hand over the abdomen and one or two fingers in the rectum, and carefully peeled out of their adhesions. Very old and firm adhesions, and those connected with pus tubes, should only be separated after the abdomen has been opened (part 5, chap. IV, par. 8,—Separation of Adhesions).

10. When the symptoms are severe enough to disqualify the patient from the enjoyment of life, and treatment proves of no benefit, the peritoneal cavity should be opened and the adhesions be broken up. If the tubes are occluded and the ovaries very much altered by inflammation they should be removed, and the uterus if displaced be restored by hysterorrhaphy or vaginal fixation (part 5, chap. IV, par. 17 and 18).

Cases in which pus in the tubes or ovaries with septic manifestations can be demonstrated should be subject to operation without delay.

During acute attacks it is preferable to delay and operate between attacks, if it then be found necessary. But symptoms threatening general peritonitis or an acute local peritonitis that steadily increases in severity may call for an immediate removal of the adnexa, and possibly of the uterus.

Evacuation of the pus from below is indicated in exceptional cases only. An accumulation of pus, or a thin-walled fluctuating pyo-salpinx of large size in the cul-de-sac of Douglas, may be aspirated, and the advisability of its

removal be discussed afterward. In cases in which the pus has lost its septic qualities, this has sometimes been followed by a cure. A fistulous opening in the rectum or vagina should be dilated and kept open by a drainage-tube or repeated dilatations with the finger (see chap. XII, par. 14). The tube may be removed after suppuration has ceased if it still causes troublesome symptoms.

Usually when an operation is advisable the diseased parts are only fit for removal. When, however, one tube and ovary are healthy they should in young patients be left, and the accompanying endometritis be thoroughly treated afterward to prevent their infection.

11. **Vaginal Oophorectomy.** When the adnexa and fundus uteri are situated low down in the pelvis, either on or between the sacro-uterine ligaments, they can be reached through a vaginal incision in the median line, commencing at the posterior wall of the cervix. After the adhesions are separated the ovary and tube are drawn into the vagina for inspection and possible removal.

FIG. 167.—THE AUTHOR'S OVARY FORCEPS.

The steps of the operation are as follows: Disinfection of the vagina and uterus (usually curettage), introduction of vaginal retractors and placing of a ligature through the lips of the cervix for traction (part I, chap. IV, par. 8). The cervix is then drawn down, and a median line incision one inch long is made with scissors in the fornix, just behind the posterior wall of the cervix. Hook up connective tissue in the incision and snip it with scissors until the peritoneal cavity is opened. Remove the retractors, pass two fingers into the cul-de-sac, loosen appendages from their adhesions, aspirate contents if sac be large, draw the adnexa (one side at a time) into the vagina, grasp with ovary forceps, introduce lateral retractors, transfix the pedicle, ligate it in two parts, amputate the adnexa, tie pedicle again en masse, disinfect, douche off and release the pedicle. Douche out

the cul-de-sac with sterilized water and close the wound with catgut sutures. If there be much oozing a drainage tube or, in bad or decidedly septic cases, a gauze tampon, may be put in the cul-de-sac and brought out at the lower unsutured angle, to be removed in thirty-six hours. The uterus, if retroverted, should be replaced, and the cervix be tamponed well back in the pelvis by strips of iodoform gauze.

Instruments: One perineal and two long vaginal retractors, a long-handled sharp-pointed pair of scissors, ovary forceps, uterine sound, five or six long-handled hemostatic forceps, pedicle needle, needle holder, sponge holders, aspirating syringe or small trocar, tenacula, needles, suture material, strips of antiseptic gauze, sponges, douche bag with glass nozzles, etc.

FIG. 168.—PEDICLE NEEDLE FOR VAGINAL HYSTERECTOMY. (*Binkley.*)

12. **Abdominal Oophorectomy.** When the adnexa are situated high up in the pelvis an abdominal incision two inches long in the median line over the pubes should be made, two fingers introduced, the pelvic cavity explored, the adhesions separated, and the adnexa removed if necessary. The uterus, if retroverted, should be stitched to the abdominal wall (part 5, chap. IV, par. 17.)

Steps of the operation: Abdominal incision (part 1. chap. IV, par. 7), separation of omentum if adherent, breaking up of adhesions of appendages, drawing one ovary and tube out into view, ligature of pedicle at uterine horn, amputation, disinfection of the stump. Removal of other ovary and tube, introduction of a glass drainage tube if necessary for oozing, closure of wound with silkworm-gut sutures. When the adhesions are firm it is better to aspirate enlarged tubes for fear of rupture. Bleeding from adhesions may be checked by ligature or catgut suture. Large vascular bands should be cut between two ligatures of fine silk. Fleshy pedicles are ligated in several sections. Trendelenburg's position should be used in complicated cases.

Instruments: Knife, scissors, a dozen or more hemostatic forceps, tissue forceps, pedicle needle, needles for abdominal wound and intraperitoneal work, sponge holders, ligature and suture material, needle forceps, aspirating syringe, gauze, sponges, etc.

13. **Hysterectomy for Diseased Appendages.** In some cases the uterus and pus tubes are matted together so extensively and firmly that an oophorectomy would be almost impossible and extremely dangerous. Segond, Péan, Jacobs, Landau, Henrotin, and others perform a vaginal hysterectomy in such cases, tearing wide open, and partly removing, all pus sacs without necessarily attempting their complete removal. Bleeding vessels are controlled by hemostatic forceps and tamponade of the vagina. Thus the pus is evacuated and the remains of the diseased structures, not being able to retain any pus, contract and heal. Sometimes the free abdominal cavity is not opened, and the upper adhesions are not disturbed. The results are good and the mortality less than that of abdominal section for such cases.

Polk, Pryor, and others in this country recommend removal of the entire uterus (including the cervix) and appendages through an abdominal incision for the same or similar conditions. Baldy and others prefer to leave the cervix.

CHAPTER XII.

PELVIC CELLULITIS.

Parametritis, Parasalpingitis, Paraproctitis, Paracystitis, Adeno-lymphitis, Phlegmon of the Broad Ligament, Pelvic Abscess.

1. **Anatomy.** Connective tissue exists in abundance throughout the pelvis. The pelvic organs appear as if originally embedded in it, and to have developed or pushed out

of it, carrying the peritoneum up with them and leaving the larger part of the connective tissue under them. It is bordered above by the peritoneum which is folded about the bladder, uterus, and uterine adnexa, below by the pelvic floor, and on the sides by the pelvic walls. It surrounds the vagina, cervix, lower rectum, and base of the bladder,

FIG. 169.—HORIZONTAL SECTION OF ONE-HALF OF THE PELVIS THROUGH THE SECOND SACRAL VERTEBRA, SHOWING PELVIC CONNECTIVE TISSUE. (*W. A. Freund.*)

s Sacrum. *c*. Connective tissue devoid of fat. *f*. Connective containing fat. *a*. Arteries beside cervix. *u*. Ureter. *b*. Bladder. *p*. Pubes.

and extends up along the lateral walls of the uterus. It connects with that of the lumbar region by way of the sacro-uterine ligament and iliac fossæ, with the inguinal region by way of the round ligaments, and with the gluteal regions and thighs along the track of the blood-vessels.

Between the cervix and ureters it is elastic and devoid of

fat globules, but contains an abundance of fat near the pelvic walls.

Lymphatic vessels surround the cervix and vaginal fornices, and extend in abundance toward the ovary and in smaller number toward the Fallopian tube. The ovary and Fallopian tube are also intimately connected by them. Lymphatic vessels lead from all parts of the pelvis to the inguinal, iliac, and lumbar glands.

2. **Pathology.** Pelvic cellulitis, or inflammation of the pelvic connective tissue, occurs in three forms: serous, plastic, and suppurative inflammation.

Serous inflammation is characterized by hyperemia, and serous- and round-celled infiltration that transforms the tissue into a gelatinous mass. It extends from the vagina, uterus, uterine adnexa, bladder or rectum, as the result of septic inflammation in these organs. The serum is absorbed within a few days, leaving some induration and permanent impairment of the integrity of the tissue, such as the disappearance of some fibers and cicatricial contraction of others. The effusion may spread through a large part of the tissue, and be attended by some intraperitoneal effusion, and in the puerperal state may prove rapidly fatal.

Plastic inflammation takes the form of an effusion that extends from an area of traumatism, or purulent inflammation, along the lymphatics, and rapidly solidifies and thus localizes itself. The region beside the vagina and cervix and that contiguous to the Fallopian tube (Fig. 170) and ovary are most often affected. The exudate may undergo gradual absorption, or it may end in suppuration.

Suppurative inflammation consists of an exudate of the plastic variety, generally in connection with traumatism and direct infection, in which the pus germs enter the tissues in such quantities that general suppuration occurs; or

the plastic lymph is liquefied in places, forming septic foci removed from the point of infection, or multiple small abscesses. Cellulitis is more often unilateral.

3. The ovary, Fallopian tube, and pelvic peritoneum, one or all, may be affected by the spread of the disease, although healthy at the beginning. The lymphatics undoubtedly play an important part in transmitting the infection, but it is difficult as yet to estimate their exact importance.

FIG. 170.—PLASTIC CELLULITIS OF THE MESOSALPINX, SECONDARY TO GONORRHEAL SALPINGITIS. (*Bland Sutton.*)

Streptococci are present in the majority of cases, particularly in those that suppurate early and extensively. The staphylococcus aureus and albus, the gonococcus, the bacteria of decomposition, the bacterium coli commune, the pneumococcus and other pathogenic germs have been discovered.

The ordinary seat of the pelvic abscess is in the lower portion or base of the broad ligament, below the ureter, and beside the cervix. It may burrow forward along the round ligament and through the inguinal canal, or laterally into the iliac fossa and from there forward or backward along the iliac and hypogastric vessels, or posteriorly along the sacro-uterine ligament into the lumbar region, or out through the lesser sacro-sciatic foramen, or along the obturator vessels to the thigh, or it may ulcerate through the pelvic floor into the ischio-rectal fossa. It may also rupture into the bladder, rectum, or externally through the skin. (Fig. 171.)

The word pelvic abscess is not intended in this connection to include peritoneal accumulations of pus nor suppurating hematomas.

4. As the result of previous mild attacks of cellulitis, local or diffuse cicatricial contraction may take place in the connective-tissue (Freund). Striæ or small bands of cicatricial tissue extend from the organs, more noticeably from the cervix, through the pelvis, drawing the organs out of place. One or both sacro-uterine ligaments are apt to be affected, constituting parametritis posterior (B. S. Schultze), and drawing the cervix backward and to one side. Or the whole pelvic connective-tissue may be affected, constituting parametritis atrophicans (Freund). In the latter cases a condition of the uterus resembling senile involution is usually present.

Parametritis atrophicans located about the rectum is called paraproctitis; about the bladder, paracystitis, and in the mesosalpinx, parasalpingitis.

5. **Etiology.** The causes of pelvic cellulitis are inflammation in the pelvic viscera, and traumatism with primary or secondary infection. Over-exertion, sexual indulgence, operations upon the uterus, etc., during the existence of salpingitis or ovaritis, are accountable for many attacks that are, however, usually complications of pelvic peritonitis. Rupture of a pyosalpinx or ovarian abscess into the broad ligament causes purulent cellulitis. The traumatisms of

labor, abortion and operative procedures with secondary infection usually produce serous or plastic cellulitis, but with primary infection give rise to the purulent variety. Blennorrhagic disease, cancer, tuberculosis, pelvic tumors, etc., are occasionally the originating causes.

6. **Symptoms and Course.** The attack may begin with or without a chill. The temperature rises between 100° and 103° F. (in puerperal cases often higher) and the pulse becomes full and somewhat accelerated, with aching in the pelvis and limbs, headache, dry, furred tongue, great thirst, malaise, drowsiness, and dryness of the skin. The pelvic pain becomes acute, the lower abdomen increases in fullness, and the stomach grows irritable when the peritoneum is also affected. The parametrium is tender, and gives a full, doughy sensation to the examining finger.

The symptoms may become less pronounced in a few days, and the case go on to recovery, the temperature remaining a degree or two above normal for a week or two. Small areas of induration may be palpated about the uterus, or a solid exudate felt to extend from the cervix to the lateral pelvic walls, or behind the cervix and around the rectum, lasting for several weeks, and immobilizing the uterus.

7. In other cases the temperature, after three or four days, rises a little higher once or twice in twenty-four hours, and goes down almost to normal between times. Perspirations become profuse, and paroxysms of pain in the pelvis make their appearance. Chilly sensations or distinct rigors may supervene. There is a distaste for food, and in some cases an offensive diarrhea. A large, hard mass is felt in one side of the pelvis which may or may not present the signs of fluctuation at some point. It usually presses the uterus to one side, and causes some bulging of the vagina,

but may extend across under the posterior vaginal fornix, or upward, forward, or backward to the pelvic brim. The pain is felt in the direction toward which the abscess is developing or burrowing. Rectal or vesical tenesmus is noticeable when it is ulcerating toward one of these viscera. The abscess finds an exit in from one to three or four weeks.

8. The symptoms of plastic cellulitis in connection with salpingitis are merged in the symptoms of that disease. A pyosalpinx that bursts into the broad ligament produces an extensive board-like induration in the pelvis. Both the uterine body and the cervix are immobilized. A hard ring may extend around the cervix, or the rectal vault may be spanned by a bridge of exudate involving the recto-vaginal septum. Some suprapubic tenderness, induration, and often tympanites are present. Rectal examination will reveal hard masses high up on either side of the rectum and over its anterior wall, apparently extending into the posterior and lateral pelvic walls near the brim.

9. If the abscess discharge into the vagina, as is often the case, there is a gush of pus with relief of pain followed by a rapid recovery or by a second accumulation with repetition of symptoms. If it discharge into the rectum a sudden purulent diarrhea brings relief, although the symptoms are apt to return. The pus sometimes burrows along the rectal walls, discharges imperfectly, and thus goes on reaccumulating almost indefinitely, particularly when connected with a pyosalpinx, and may finally exhaust the patient. The lower rectal walls are usually felt by the examining finger to be expanded or ballooned, and do not collapse.

An abscess opening into the bladder generally reaccumulates many times, and tests the endurance of the patient very severely. When it extends toward the cuta-

neous surface it is amenable to treatment and heals within a reasonable period of time.

10. **Diagnosis.** From *diseased uterine adnexa* cellulitis may be known by the close relation of the exudate to the vagina, cervix, or anterior, or lateral uterine walls. The exudate feels as if it had been fused with one or more of these parts, and occupies the lower and anterior part of the pelvis. The diseased adnexa are either higher up or farther back, occupying the upper and posterior portions of the pelvis, and form more definitely and regularly defined masses.

Solid tumors of the broad ligament have more of a rounded contour and their walls form an acute angle with the walls of the uterus where they lie against it, instead of extending straight out from the uterus as does the exudate.

Fibroids move with the uterus and do not immobilize the uterus until large enough to distend the broad ligament, and then not as rigidly as the parametric exudate of the same size. They are not as tender.

11. **Prognosis.** Pelvic cellulitis occurring in the puerperal state may prove fatal in two or three days, from the intensity of the septic invasion, or in one or more weeks from septic exhaustion. At other times the disease is seldom fatal. Pus when formed may be expected to find an outlet sooner or later, and recovery may then be rapid or slow. Occasionally the suppuration will last for years and finally exhaust the patient.

12. **Treatment.** The prophylactic treatment consists in disinfection of the tissues from which the infection proceeds, and in measures to limit inflammatory reaction. A thorough disinfection of a septic uterus or other pelvic organ operated upon, both before and after the operation, an ice-bag on the abdomen after the operation, and subsequent antiseptic douches, constitute examples.

The treatment of the acute stage is the same as for salpingitis (chap. XI, par. 8).

13. In the chronic non-suppurating forms (parametritis posterior and atrophicans) in addition to local treatment of the accompanying endometritis the vagina should be tamponed as recommended for subinvolution (chap. IX, par. 7). Pelvic massage may also be of benefit in stretching cicatricial contractions and in invigorating the circulation.

Massage for chronic cellulitis without a palpable exudate is performed somewhat as follows: One or two fingers of the left hand are introduced into the vagina (dorsal-recumbent position) and press the cervix upward and backward, anteverting the uterus. The other hand on the abdomen makes circular friction motions over the fundus uteri, gradually working toward the cervix, then presses upon and strokes the sacro-uterine ligaments from the uterus backward.

In parametritis posterior, the vaginal fingers pull the cervix forward while the hand over the abdomen pulls the fundus forward, and thus stretches the ligaments moderately. This should be repeated two or three times. Then friction movements are made over the broad ligaments, commencing at the sides of the uterus. If there be contraction on one side, first the cervix is drawn toward the opposite side by the vaginal finger and then the whole uterus bimanually.

14. If suppuration takes place, it is well to watch and wait until its location can be determined. The pus should be evacuated through the vagina when the abscess-wall bulges below the cervico-vaginal junction. An exploring needle should be introduced, and when pus is found a sharp pair of scissors may be thrust along the needle and the points be separated and withdrawn. Bleeding vessels may be caught by hemostatic forceps and held until the vessels are secured, or the forceps may be left on for a few hours. The cavity is washed out thoroughly, its walls curetted by the finger, and a double drainage-tube introduced. The cavity can then be irrigated twice daily until obliterated. A one or two per cent. solution of car-

bolic acid makes a good mild antiseptic and stimulating wash.

Small or fistulous openings into the vagina should be probed and enlarged, and if possible laid wide open.

When there is any doubt as to the character of the tissue to be traversed, it is better to dissect our way along the aspirating needle and tie vessels as we cut them. The surgeon should keep below the level of the cervico-vaginal junction in order to avoid the ureters and uterine arteries. Abscesses between the bladder and uterus should be opened by a short transverse incision in front of the cervix, and a longer incision extending forward in the median line. The bladder is then separated from the uterus, if not already separated, until the abscess is reached.

When the abscess bulges against the rectal wall, and is separated by considerable connective-tissue from the vaginal wall, the author has successfully opened and rapidly cured them by puncturing through the anterior rectal wall as low down in the *median line* as practicable. When an old abscess discharges into the rectum well below the sacro-uterine ligaments, as most pelvic cellular abscesses do, the finger may be forced into it, and can usually find a pus track along the mucous membrane. By tearing through the mucous membrane along its whole course, the drainage becomes perfect, and the cavity rapidly contracts. It is an easy matter to tear this track open again if it closes too rapidly. Such manipulations are only admissible well below the sacro-uterine ligaments, near which the large vessels are situated. The vessels below are not large, and can easily be caught by forceps or tamponed. The author has done it a dozen or more times, and has seen it done many more times, and has never seen a vessel wounded that required attention. The sphincter ani should be dilated in order to facilitate drainage and rectal lavage. The rectum should be washed out three or four times daily with large quantities of water. The rectum can be exposed to view as high as the sacro-uterine ligaments by Sims' speculum, introduced in the left lateral, or Sims' position, or still higher by Kelly's rectal endoscope with reflected light.

These cases must be differentiated from pyosalpinx opening into the rectum at or above the sacro-uterine ligaments. To tear the rectum extensively in such a case might lead to a fatal hemorrhage.

Nearly all writers condemn this rectal treatment of pelvic abscesses, and advise making a counter opening in the vagina, which may be

separated from it by considerable connective tissue. In some cases this may be done, but many times it involves either laying open the vagina very extensively, or it leaves a fistulous track, through which it is hard to cure the abscess. In two instances openings of cystic Fallopian tubes into abscesses which were discharging per rectum were dilated through the abscess cavity, and the suppuration cured with relief of symptoms. Theoretically, the invasion of the abscess cavity by fecal matter is a flagrant disregard of the antiseptic or aseptic principle; practically, it does not prevent a rapid cure.

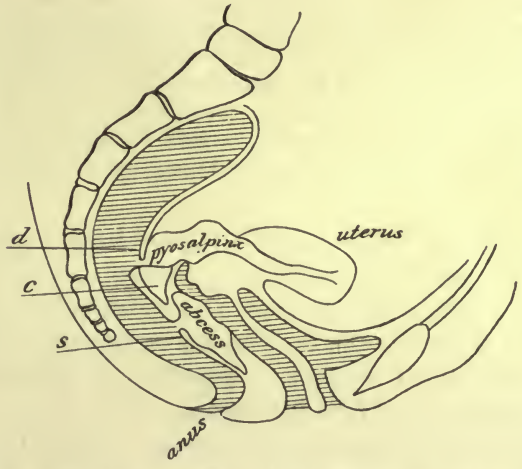

FIG. 171 —PYOSALPINX AND PELVIC ABSCESS OPENING INTO THE RECTUM.

d. Sacro-uterine folds, and region of third sphincter, where large blood-vessels are found. Pyosalpinx opens into rectum. Here extensive laceration of rectal walls would be dangerous. *c*. Cul-de sac of Douglas, pyosalpinx being a little to one side. *s*. Safe place to tear open the abscess walls, blood-vessels being here small and laterally situated.

15. When the abscess has opened into the bladder, and does not heal of itself, or after repeated bladder-douches, a vesico-vaginal fistula may be made by cutting through the vesico-vaginal septum in the median line about 4 cm., or one and a half inches, beyond the mouth of the urethra, guided by a sound in the bladder. Through this the opening can sometimes be found and dilated. At other times

the bladder can be dissected from the anterior wall of the cervix through the T-shaped incision, as recommended above (par. 14) for reaching an abscess between the uterus and bladder. Supra-pubic cystotomy has been recommended, but seldom made use of.

Special routes have been invented. Thus Hegar made an incision from the tuberosity of the ischium to the tip of the coccyx, and went through the ischio-rectal fossa. Sänger made a vertical incision through the lower third of the labium down between the tuberosity and the anus an inch below the anus. Zuckerkandl's incision across the perineal body from one tuberosity to the other, and separation of the vagina and rectum, has been recommended for pus behind the vaginal fornix. The sacral method (Kraské and others) has been made use of. These are special methods for special cases, and are seldom of practical value for the evacuation of cellular pelvic abscesses.

16. When an abscess extends upward toward Poupart's ligament, it may be reached by an incision parallel to the ligament. The peritoneum may, if necessary, be reflected upward, and the abscess be elevated by pressure from the vagina made by an assistant. Sometimes a drainage tube can be carried through to the vagina.

When the abscess points in the lumbar region the incision should be over the crest of the ilium and preferably near and parallel to the external margin of the quadratus lumborum muscle.

It is rare that a primary pelvic cellular abscess requires a peritoneal section. When it, however, cannot be reached otherwise the peritoneal cavity should be opened. It may then be treated in three ways: (1) Its walls if thick may be sutured to the peritoneal edges, or the space between the wound and the abscess wall may be packed with iodoform gauze. The abscess is opened after adhesions have formed and firmly shut off the abdominal cavity, viz., in four or five days (Hegar). (2) The abscess may be aspirated, washed out and incised, and the edges stitched into the abdominal wound. (3) Under guidance of the fingers in the abdomen the abscess may be pene-

trated by a trocar from the vagina, the abdomen be immediately closed, and the remaining treatment be carried out by way of the vagina. (A. Martin.)

CHAPTER XIII.

HYPEREMIA AND HEMATOMA OF THE OVARY.

(*Anatomy of the Ovary.*)

1. **Anatomy.** Normal ovaries vary in size even in the same individual. The ovary weighs from 5 to 10 gm., or 75 to 150 grains. They are almond-shaped bodies 3 to 5 cm., 1 to 2 inches, in length, 2 to 3 cm., or from ⅔ to one inch in width, and about 12 mm., or about half an inch in thickness. They are situated on either side of the uterus extending from 2.5 cm., or one inch, to one side of the uterine cornua toward the posterior half of the pelvic wall near the pelvic brim. They project from the posterior wall of the broad ligament, and the peritoneal fold thus formed under it is called the mesovarium. The ovarian ligament is from 2 to 3 cm., or about one inch, long and connects the ovary with the uterus immediately under the Fallopian tube. The infundibulo-pelvic ligament is the condensed edge of the broad ligament connecting the ovary and tube with the side wall of the pelvis.

The edge of the ovary which is in relation with the mesovarium, through which the vessels and nerves enter it, is called the hilum. The portion in relation with or next to the hilum is called the paraoophoron and is composed of fibrous tissues that contains the vessels, nerves, lymphatics, and a few unstriated muscular fibers. The cortical portion is called the oophoron, and contains the Graafian follicles. It is covered on the posterior surface by cylindrical epithe-

lium instead of peritoneum, which is called the germ epithelium, and under which lies the fibrous covering of the ovary, or the tunica albuginea. The younger or peripheral Graafian follicles number many thousands and are, as a

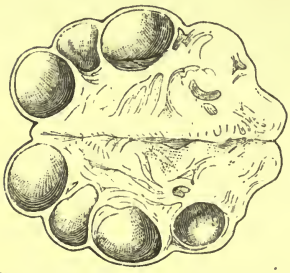

FIG. 172.—SECTION OF OVARY SHOWING PERIPHERAL RIPENED FOLLICLES. (*Sutton.*)

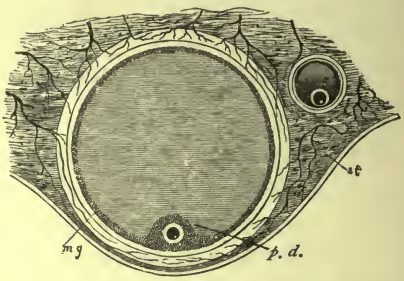

FIG. 173.—TWO GRAAFIAN FOLLICLES. *mg.* Membrana granulosa. *st.* Ovarian stroma. *pd.* Proligerous disc. (*Davis.*)

rule, 0.25 mm., or about $\frac{1}{100}$ of an inch or less, in diameter. The deeper follicles are not so numerous and are larger, varying up to 1 mm., or $\frac{1}{24}$ of an inch.

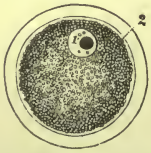

FIG. 174.—HUMAN OVUM. 1. Germinal vesicle. 2. Yelk.

FIG. 175.—FOLLICULAR HEMORRHAGE OF THE OVARY AFTER DEATH FROM EXTENSIVE BURNS. (*Winckel.*)

The ripening follicles are the largest, and although developed from the deeper ones, are situated near the surface.

The membrana propria, called also the tunica fibrosa of the Graafian follicle, is lined by the membrana granulosa, and contains fluid called the liquor folliculi.

The ovum is 0.2 mm., or $\frac{1}{120}$ of an inch, in diameter, and is composed of the vitelline membrane, or zona pellucida, the vitellus or yelk, the germinal vesicle (.04 mm., or $\frac{1}{700}$ of an inch) in diameter, which contains the germinal spot (.01 mm., or $\frac{1}{3000}$ of an inch.)

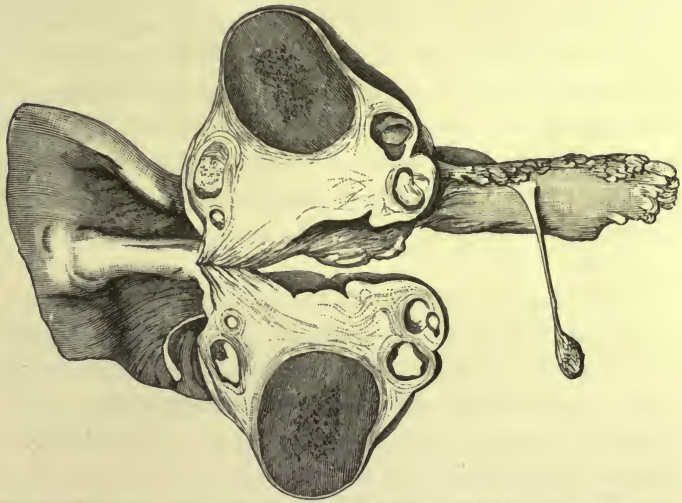

FIG. 176.—FOLLICULAR HEMORRHAGE OF RIGHT OVARY (NATURAL SIZE). FOLLICLES ABOUT TO RUPTURE. (*Winckel.*)

The parovarium is composed of a mass of delicate tubules in the broad ligament extending from the ovary to the ampulla. They are the remains of the Wolffian body, and are lined with ciliated epithelium.

2. **Pathology.** Normal hyperemia of the ovaries exists during pregnancy and menstruation, and just previous to and during the sexual act. At other times hyperemia results in persistent dilatation of the vessels and some

serous effusion into the stroma. In severe cases hemorrhage into the Graafian follicles takes place. The hemorrhage may remain confined to one or several follicles, or it may rupture the septa between them, and thus form one or more small clots from the size of a pin's head to that of a hazelnut, or a single one, varying up to the size of a walnut, or even larger. Hemorrhage into the stroma is apt to assume the form of numerous minute extravasations.

The fluid may be completely absorbed, or may remain as a coagulum or as a mass of tarry fluid, or be represented by a corrugated cyst wall containing a colloid substance, or give rise to an abscess. Rarely the follicles burst, and an intraperitoneal hematocele forms. If the congestion is not soon relieved or is often repeated it develops into inflammation. Chronic oophoritis is a frequent complication of hematoma.

3. **Etiology.** Hyperemia and hematoma are caused by menstrual derangements, excessive coition during menstruation, onanism, uterine displacements, pelvic tumors, etc. Anemia, sedentary habits, and toxemia predispose to it. Blows over the ovary, extensive burns, etc., occasionally produce hemorrhage into the follicles.

4. The **Symptoms** are dull pain in the ovarian region, nausea, and menorrhagia or metrorrhagia. Hematoma and gyroma (chap. XIV, par. 4) are apt to cause persistent pain in the ovary (made worse upon assuming the erect position), dyspareunia, hysteria, neurasthenia, and, in fact, nearly all of the symptoms of oophoritis.

5. The **Diagnosis** is based upon the enlargement and tenderness of the ovary with but slight if any temperature, and upon uterine hemorrhage. It cannot always be distinguished from chronic oophoritis.

6. **Treatment.** At the first onset rest in bed, an ice-bag over the abdomen, and one-eighth of a grain, or 0.01 gm., of tartar emetic every two hours until nausea supervenes, will usually afford relief. Later, counter-irritation by chloroform liniment or turpentine stupes over the lower abdomen, hot douches, ichthyol tampons, tonics, and massage are beneficial. (Part 1, chap. v.) Rest in bed during menstruation, morning sponge baths, tonics, regulated out-of-door exercise, change of climate, and in some cases the rest cure (part 3, chap. x par. 6), are indicated in cases connected with anemia, debility, and neurasthenia.

It occasionally becomes necessary to remove the ovary or ovaries to relieve the patient of an unbearable burden.

CHAPTER XIV.

OOPHORITIS.—INFLAMMATION OF THE OVARY.

GYROMA, ENDOTHELIOMA.

1. Oophoritis occurring as a complication of salpingitis has been described (chap. x, par. 11). Acute oophoritis is seldom observed except in that connection and in the puerperal state. Chronic oophoritis independent of these conditions usually develops insidiously, the mild acute attacks being overlooked. The left ovary is more frequently affected than the right.

2. **Pathology.** In its first stages oophoritis presents the ordinary features of acute inflammation elsewhere, viz., hyperemia, edema, and round-celled infiltration of the stroma. The follicles may be but little enlarged or may be

dropsical. The disease rapidly ends in resolution or passes into the chronic form.

3. Chronic inflammation may assume the form of a peripheral, diffuse, or hypertrophic inflammation, a sclerosis, a follicular inflammation, a cystic degeneration, or a suppurative inflammation. Among the results of inflammation are gyroma and benign endothelioma.

In *peripheral oophoritis* or *peri-oophoritis* the tunica albuginea is sclerotic either in places or generally, and often surrounded by adhesions. The tissue underneath presents under the microscope the following conditions: Dropsical and apoplectic follicles, degenerated corpora lutea, minute interstitial extravasations of blood into, and sclerosis of, the fibrous portion (Fig. 165).

Diffuse oophoritis is characterized by an increased vascularity about the follicles with hyperplasia advancing to sclerosis surrounding the follicles, corpora lutea, and blood-vessels.

In *hypertrophic oophoritis* there is a hypertrophy and hyperplasia of the connective tissue, accompanied by a progressive atrophy of the follicles. The ovary is enlarged and the surface lobulated and furrowed. It is an advanced stage of diffuse oophoritis.

Sclerosis, or *atrophy* of the ovary, is the result of the above-mentioned forms of inflammation, and is attended by a shrinking of the fibrous tissue and more or less complete destruction of the ovisacs and follicles. The ovary is small and may present a corrugated appearance, as in the senile state.

In *cystic oophoritis* the follicles are increased in number and size, and in some cases the stroma is edematous or sclerotic. It may be localized or involve the whole ovary.

Cystic degeneration is an advanced stage of follicular oophoritis in which the ova and other distinctive features of the ovary are to a great extent destroyed. One or two follicles may be distended by a serous or bloody fluid from the size of a hazelnut or a small egg, with sclerosis or atrophy of the follicular epithelium and of the surrounding structures. Or many follicles may be distended, giving the ovary almost a honeycomb appearance when cut open. It may be as large or larger than a goose egg.

Suppuration or *ovarian abscess* has been described in connection with salpingitis (chap. x, par. 11). Occasionally an abscess is formed without participation of the tube, the infection entering by way of the lymphatics.

Endometritis is a frequent complication of long standing cases.

4. *Gyroma*, according to Mary Dixon Jones, consists of transformed corpora lutea vera, or of pregnancy. The author's observation would lead him to consider them the result of exaggerated hemorrhage into the corpora lutea, or an extravasation about the blood-vessels, with subsequent changes due to the inflammation and imperfect absorption. Dr. Jones maintains that the hemorrhage is secondary to the gyroma. They may be single or multiple.

Fig. 177.—Benign Ovarian Endothelioma. (*M Dixon Jones.*)
C. Fully developed convoluted formation.
F. Fibrous connective tissue.

5. *Benign endothelioma* consists of accumulations of endothelial cells, globules,

brown fat globules, and pigment cells in closed spaces bounded by connective-tissue fibers (M. Dixon Jones). The formation is surrounded by numerous blood-vessels. It is a development within the walls of the follicles, from the endothelium of the blood-vessels. Benign endothelioma is usually single, and may occupy the whole ovary. See Endothelioma of the Ovary (part 8, chap. VII, par. 3).

6. **Etiology.**—The majority of cases of acute oophoritis are the result of infection from the Fallopian tube. The ovaries may also become infected, by way of the lymphatics, from a lacerated and suppurating cervix or vaginal wall, from an abscess in the pelvic connective tissue, from an appendicitis, or from rectal ulceration. It may also be caused by ovarian hyperemia or hemorrhage, or from certain forms of blood poisoning, as septicemia, the eruptive fevers, and poisoning by minerals, such as phosphorus and arsenic

7. The chronic forms may result from the acute forms, or may occur without any apparent acute stage from repeated hyperemia or from infection. The disturbances connected with dysmenorrhea, particularly of the mechanical and membranous varieties, and in fact almost any serious disturbance of the pelvic circulation acting during menstrual congestion, tend to produce the disease. Chronic metritis and chronic dysentery are examples. Retroversion, prolapse of the ovary, fibroid tumors, ovarian tumors, and syphilis are sometimes responsible.

As predisposing causes may be mentioned excessive or unnatural venery, sedentary occupations without rest during the menstrual period, and close application to studies and social duties during and after the age of puberty, with an insufficiency of out-of-door exercise.

Distention of the sigmoid flexure by feces and varicocele of the broad ligament probably have something to do with the increased frequency of ovaritis on the left side.

8. **Symptoms.** The most noticeable symptom is persistent pain in one or sometimes both iliac regions, that may extend up over the crest of the ilium, into the hip or down the limb, or into the rectum or bladder. It is made worse by standing or walking, and by the approach of the menstrual period, and is apt to be more or less alleviated by the flow. In removing ovaries, I have noticed that the pain is frequently on the side the less affected, but in such cases the less affected side was in a state of more recent and hence more acute inflammation.

In the earlier stages menstruation is apt to be increased or prolonged, in the later stages diminished or even permanently suppressed.

When the inflammation is severe and accompanied by hematoma, gyroma, and endothelioma, then digestive disorders, constipation, palpitation of the heart, anemia, neurasthenia, hysteria, emaciation and sofa-invalidism are frequently observed.

Sterility is quite common, but usually depends upon the lesions in the uterus or tubes that are so often present.

In very chronic cases the symptoms of the accompanying endometritis may overshadow those of the primary oophoritis.

9. **Diagnosis.** The ovary is felt beside or behind the uterus, is tender to the touch, and if adherent cannot be moved about by bimanual manipulation. It is somewhat of the shape of a flattened olive, and more or less lobulated. If not adherent, the ovary recedes when touched, but the ovarian ligament can be felt bimanually connecting

it with the uterus. The enlarged tube is usually longer and more closely connected with the uterine horn.

10. **Prognosis.** A perfect cure seldom takes place. In many cases the general health suffers seriously and for a long time, or until the cessation of ovulation from age diminishes the intensity of the inflammation. In others, as the disease becomes more chronic, the suffering ceases and the patient is symptomatically cured. Death seldom results, although in a few cases the protracted suffering wears the patient out.

11. The **Treatment** of acute oophoritis is the same as that recommended for salpingitis and hyperemia of the ovary.

The treatment of chronic oophoritis consists in relieving pelvic congestion, separating adhesions, supporting the pelvic organs, removing all sources of irritation, and improving the general health of the patient.

Hot vaginal douches, scarification of the cervix, and laxatives relieve congestion. Vaginal tamponade, as has been recommended for subinvolution (chap. IX, par. 7), or Thomas' retroversion pessary with thick posterior arm, and pelvic massage (see treatment of prolapse, part 5, chap. V, par. 10) help to support the parts. The daily application of tinct. of iodin over the iliac regions, the avoidance of sexual excitement or intercourse, rest in the recumbent position for two hours in the middle of each day, and restriction of exercise or occupation so as to avoid producing pain in the parts, are beneficial in relieving and preventing irritation. General massage, Swedish movements, sponge baths, light calisthenics, moderate walking, tonics (part 1, chap. V.) aid in improving the health. Some patients require a change of climate, or relief from studies or from the excitement and strain of social obligations.

10. When adhesions exist they should be separated (part 5, chap. IV, par. 8). If that affords no relief, or if they cannot be separated without too much injury of the parts, or if they are badly diseased, they should be removed (see part 6, chap. XI, par. 11 and 12).

In case one ovary and tube be sound they should be left, and the uterine cavity, if unhealthy, should be treated until cured, in order to avoid infection of the remaining tube and ovary from that source. It is possible in some cases to resect the diseased area of an ovary and thus leave a portion to preserve the sexual characteristics and make subsequent impregnation possible. (Polk, A. Martin.) In some cases, on the other hand, the nervous symptoms are so great about the menstrual periods that it may be desirable to remove both ovaries in order at the same time to arrest menstruation. Oophorectomy for this purpose has been called *Castration*. (Hegar.)

PART SEVEN.

GENITAL TUBERCULOSIS.

CHAPTER I.

TUBERCULOSIS OF THE VULVA AND VAGINA.

1. Genital tuberculosis is a much more common affection than was formerly supposed. The order of frequency of the organs affected is as follows: the tubes, uterus, ovaries, vagina, cervix, and vulva. (J. Whitbridge Williams.) It is secondary to tuberculous disease elsewhere in from 85 to 90 per cent. of the cases observed.

Primary inoculation, as a rule, occurs through the external genitals (coitus, examinations, etc.), although the disease is supposed in exceptional instances to have invaded these parts by way of the general circulation. *Secondary infection* may take place by way of the peritoneal cavity and the lymph-channels from the abdominal viscera or the genito-urinary organs, or through the general circulation from distant organs, or by auto-inoculation from the secretions.

2. **Tuberculosis of the Vulva.** Lupus is the form usually observed on the vulva, and does not differ materially from lupus affecting the skin elsewhere.

In advanced cases of tuberculosis of the genital organs the discharge sometimes excoriates the vulva, and gives rise to a deposit of tubercles in the corium, and one or more tuberculous ulcers. The ulcer has irregular jagged edges, and a bright red base with numerous minute gray or yellow

spots faintly visible over it. It is moistened with a purulent discharge.

The *diagnosis* is based upon the appearance of the ulcer and the presence of tuberculous disease elsewhere in the genital tract.

The *treatment* is extirpation of the diseased tissue and suture of the raw surfaces. If there is doubt about the condition of any of the tissue remaining, it should be thoroughly cauterized.

The material for study is so scanty that our knowledge of vulvar tuberculosis, excluding ordinary lupus, is unsatisfactory. The case of Emmanuel (*Zeitschr. fur Geb. u. Gyn.*, XXIX) was connected with infection of the inner genitals; some of those of Deschamps, Chiari, and Zweigenbaum with vaginal tuberculosis. Primary infection of the vulva probably assumes the form of lupus in nearly all cases.

3. **The Vagina.** The vagina is not easily infected by tuberculosis. When infected, it is usually in the posterior fornix by the discharges from the tuberculous uterus, or by an extension from the cervix. Sometimes, however, the bladder or rectum, or even a distant organ, may be the source.

Vaginal tuberculosis commences in the form of miliary tubercles, never larger than a millet-seed, some of which in time undergo caseation, break down and form ulcers, covered by a caseous matter. The ulcers are slightly depressed, and have a granular base of a yellowish or grayish cast. The edges are perpendicular, sharply defined, irregular, and surrounded by a deposit of miliary tubercles, forming a red areola around them. Perforations into the neighboring tissues, and fistulæ, sometimes occur.

4. The *diagnosis* is based upon the grumous discharge containing cheesy particles, upon the appearance of the ulcers, the presence of tuberculosis elsewhere, particularly

in the uterus, and microscopic examination, or inoculation of a Guinea-pig (chap. II, par. 4).

Granular vaginitis is either connected with recent general vaginitis, or is chronic without showing the characteristic vaginal ulceration or the development of tuberculous infection elsewhere.

Chancres and chancroids are differentiated by the clinical history and prompt effect of treatment.

A microscopic examination, or an inoculation experiment upon a Guinea-pig, is necessary to distinguish it from epithelioma, which may resemble it.

4. *The treatment* consists in an excision of the tissue and cautery of the base, if the other genitals are not affected. When, however, the uterus and Fallopian tubes are affected they should also be removed, if possible, unless there be general infection. Curetting and cautery, and subsequent applications of the tincture of iodin or of iodoform, are of palliative value.

CHAPTER II.

TUBERCULOSIS OF THE CERVIX UTERI.

1. Tuberculosis of the cervix is seldom primary, although it may result from infection coming by way of the vagina, particularly from the semen of a tubercular testicle. It usually occurs in connection with tuberculosis of the posterior vaginal fornix.

It has been seldom recognized in life, although, as in Pean's case, many tuberculous cervices have probably been removed for supposed cancer.

2. **Pathological Anatomy.** The first changes *within the cervix* are those of catarrhal inflammation with small tubercles developed beneath the surface. The folds of the arbor vitæ contain a sticky mucus and show secondary villosities. The glandular cavities are enlarged, and the connective tissue filled with small cells, among which giant cells can be seen with a low power. The mucous membrane on the surface and throughout the glands is lined

FIG. 178.—TUBERCULOSIS OF THE CERVIX UTERI. 150 diameters. (*Cornil.*)

with columnar epithelium. (Cornil.) In the advanced stages the glands are compressed, the nuclei of the epithelial cells undergo atrophy, and the cells themselves become more or less fused into a protoplasmic mass, in which only the remains of the nuclei are recognizable.

3. The *vaginal portion* feels more or less enlarged, hard,

and nodular, and presents somewhat the appearance of a granulating wound. The surface is studded with numerous grayish-white, translucent-looking granules, up to the size of a pinhead, surrounded by vascular spots that bleed readily upon being touched, and are covered by a sticky, yellowish, grumous secretion.

The surface loses, except in a few places, its normal pavement epithelium. The vascular spots exhibit under the microscope dilated capillaries and bloody extravasations. The granular surface fails to reveal any papillary formation, but the normal tissue is supplanted by areas of small-celled infiltration containing giant cells. There is more or less caseation superficially, but deeper in the substance of the cervix typical tubercles are found. (R. Emanuel.)

Koch's bacillus cannot always be detected.

4. The **Symptoms,** except those of cervical endometritis, do not usually attract attention until the disease is well advanced, when local pain, a grumous discharge containing whitish granules, and the development of tuberculosis elsewhere are the chief ones.

5. The **Diagnosis** is based upon the macroscopical and microscopical appearances described in par. 2, upon the presence of caseous matter (and perhaps giant cells and tubercle bacilli) in the discharge, the endocervicitis, and the discovery of tuberculosis elsewhere in the system. Inoculation of the discharge into the peritoneal cavity of a Guinea-pig will usually develop tuberculosis within two weeks.

6. The **Prognosis** is good in cases of primary infection if the disease is recognized before it has spread to other parts. Before the diagnosis is made the disease has usually obtained a foothold beyond the cervix, or exists elsewhere in the body, and an ultimate development of general tuberculosis may be expected.

7. **Treatment.** If the tuberculous condition is confined to the cervix the latter should be amputated well beyond the limits of the disease. If the upper portion of the vagina is likewise affected, that should be removed and the edges of the resulting wound united by sutures, or cauterized with iodized phenol (three parts carbolic acid and one of crystals of iodin).

CHAPTER III.

TUBERCULOSIS OF THE CORPUS UTERI.

1. Tuberculosis of the uterus commences as a deposit of small miliary tubercles under the epithelium, usually with inflammation and sometimes ulceration about them. In this stage the disease has not been recognized in life nor clinically described.

As the tubercles develop they undergo necrosis and form irregular ulcers covered with caseous matter, the mucous membrane about them being infiltrated with small cells. The disease spreads to the entire endometrium, but does not pass the internal os. It invades the muscularis, causing hypertrophy of the uterine walls, and may finally perforate them. Obstruction of the internal os and pyometra sometimes takes place. This stage is called *diffuse tuberculosis of the uterus*, and is the form usually seen.

2. The **Symptoms** are at first those of endometritis. Later there is a thickening of the uterine walls and a grumous discharge containing cheesy matter. Amenorrhea is a common symptom, and is connected with a state of general debility, and tuberculosis elsewhere. In some cases, however, there is menorrhagia, in others no deviation from

the normal. Usually the Fallopian tubes are enlarged and adherent, and may be surrounded by an abundant exudate, extending laterally from the uterus.

3. The **Diagnosis** is based upon the signs and symptoms just mentioned.

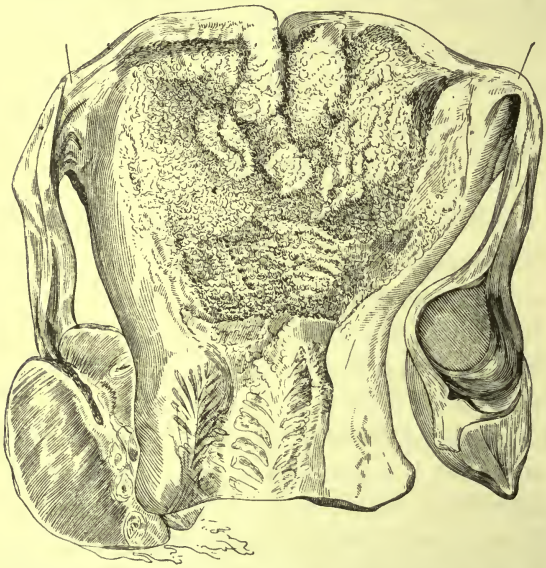

FIG. 179.—DIFFUSE TUBERCULOSIS OF THE UTERUS. (*Barnes.*)

In malignant disease the hemorrhage, watery discharges, stinking odor, rapid progress, and freedom of the appendages from infiltration serve to differentiate it. In the early stages a microscopic examination of the discharge or of curetted particles may be necessary.

4. The **Treatment** should be a total extirpation, preferably per vaginam, and should include a removal of the appendages. If the appendages are extensively affected an abdominal incision may be necessary. Should there be an

extensive development of tuberculosis elsewhere, a curetting and packing of the uterus with iodoform gauze and powder might be done as a palliative measure. In advanced cases of general tuberculosis surgical interference is useless. Antiseptic vaginal douches should be used.

CHAPTER IV.

TUBERCULOSIS OF THE FALLOPIAN TUBE AND OVARY.

1. *Tuberculosis of the Fallopian tube* has been found in from two to eight per cent. of operations for diseased appendages. It is, as a rule, secondary, but in a large majority

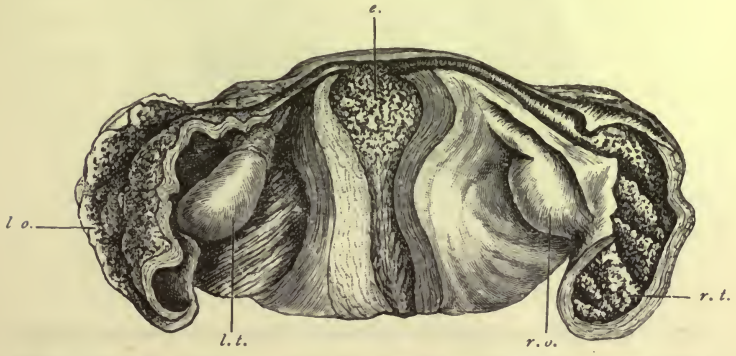

FIG. 180.—PRIMARY TUBERCULOSIS OF THE TUBES AND OVARIES, POSTERIOR VIEW. (*Kotschau.*)

r. o. Right ovary, enclosing caseous masses evacuated by the tearing apart of adhesions. *r. t.* Right tube, dilated and adherent to ilium, having formed part of the wall of a tuberculous abscess. The left ovary, tube, *l. o.* and *l. t.*, and endometrium, *e*, are also tuberculous.

of cases the tube is the first portion of the genital track affected. It more often begins at or near the fimbriated end, and spreads to the uterus and ovary, and is as a rule

bilateral and associated with tubercular peritonitis. Since the attention of operators has been called to the disease the frequency with which it has been found has steadily increased. It occurs by preference in young women, although childhood and old age are not exempt.

2. **Pathological Anatomy.** It generally commences in the *miliary form* as a deposit of tubercles in places underneath the inflamed epithelium, but in this stage it is of no clinical importance, since it cannot be recognized except by a microscopic examination of the removed parts (the "unsuspected genital tuberculosis of Williams").

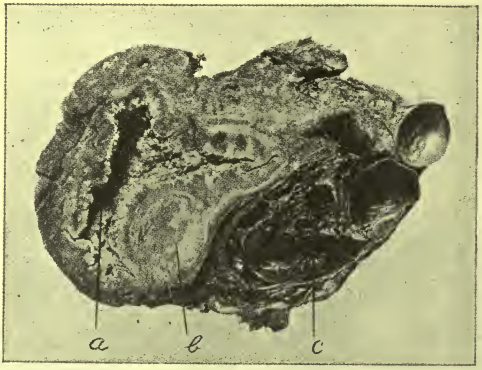

FIG. 181.—TUBERCULAR PYOSALPINX. (*Freeborn.*)
a. Lumen of the tube. *b*. Tubercular mass in the meso-salpinx. *c*. Cystic ovary.

3. As in the uterus, the *chronic diffuse tuberculosis* is the variety ordinarily met with in the tube. It affects as a rule a large portion or all of the mucous membrane, but does not invade the muscular wall until late. A deposit of tubercles on the peritoneal surface often exists in connection with an accompanying tubercular peritonitis. The epithelium and some of the muscular tissue are destroyed by infiltration with inflammatory products. The tubercles under-

go caseation, producing ragged ulcers, and sometimes an almost complete denudation of the muscular tissue, which is exposed when the caseous material is removed. This material may exude from the fimbriated end, or if the tube is closed, may accumulate, with mucus, granular debris, and sometimes pus, forming a cystic salpingitis. The contents may be quite thin, or thick and cheesy, or hard and dry, or even calcified. Ordinarily the accumulation is small in amount, but it may attain large proportions.

Koch's bacillus is not always found. Pus germs may never be present, or may be present for a time and both the germs and pus afterward disappear. The tubes are usually adherent to the posterior surface of the broad ligament, uterus, intestines and omentum.

4. *Chronic fibroid tuberculosis* of the tubes (Williams) differs from the above in that there is a large amount of fibrous tissue and a small number of tubercles. The lumen is greatly distorted. Inflammatory changes may or may not be present. The marked feature appears to be its chronicity.

5. The *ovary* may be affected in connection with tuberculosis of either the tube, or peritonem, or both. Miliary tubercles, caseous masses and tuberculous abscesses are the varieties of the disease found.

6. **Symptoms and Diagnosis.** In many cases the symptoms are overlooked because they are mild or have been overshadowed by those of other disease, particularly of tuberculosis elsewhere. In other cases they do not differ from the symptoms of other forms of tubal inflammation.

Salpingitis occurring in healthy women soon after marriage, or after labor, abortion or a previous attack of gonorrhea, is seldom tuberculous in character. When it

occurs in delicate virgins, with considerable enlargement and induration of the appendages, particularly if there is a tuberculous family history, or in women affected with tuberculosis in other parts, we suspect it to be of tuberculous nature. Encysted peritonitis in the lower abdomen adds greatly to the probability. A low morning temperature with slight afternoon rise extending over a long period of time is characteristic in many cases. Ordinary salpingitis is subject to remissions and exacerbations dependent largely upon traumatic influences, while the tubercular variety is steady in its progress and remains the same or gets worse in spite of all precautions.

7. The **Prognosis** is as a rule unfavorable. However, an early operation will cure many cases in which there is but little infection elsewhere in the system.

8. **Treatment.** The only curative treatment is removal of the appendages. The contraindications are general infection, and a spread of the disease to the extent of making the complete removal of the disease impracticable. The uterus if affected should be removed also. Tubercular peritonitis is not a contraindication, since it is apt to be benefited by the operation. The abdominal section should be preferred, since a more complete removal of diseased tissue can be effected, but vaginal section may be indicated if the uterus is affected and the tubes not surrounded by much exudate.

CHAPTER V.

TUBERCULOSIS OF THE PERITONEUM.

1. Tuberculosis of the peritoneum in women is associated with tuberculosis of the Fallopian tube in more than one-third of the cases. The infection comes by way of the lymphatics from the abdominal viscera, or from the general circulation. It may precede, follow or arise coincidently with that of the tubes.

The three varieties, miliary, fibroid and caseous, have been observed.

2. **Miliary Tuberculosis.** Miliary tuberculosis may exist in a latent and an acute form.

In the latent form the tuberculosis develops without noticeable symptoms, and may go on to the fibroid stage and a practical cure without its presence having been detected. Of this nature are the cases that are discovered by accident at peritoneal sections, and also those which subsequently get well.

In the acute form the peritoneum over the tubercles may be slightly hyperemic, or it may be in a state of active inflammation with intense redness, loss of luster and a fibrinous exudate. A yellowish or bloody serum may be free in the abdominal cavity, or it may be encapsulated by visceral, parietal and omental adhesions, which, however, are seldom either firm or extensive. The tubercles are situated between the layers of peritoneum over some of the viscera or are scattered over the visceral and parietal surfaces.

3. The *symptoms* may either develop suddenly or gradually. In all cases some prodromata are present, such as

slight abdominal pains, a tendency to tympanites, imperfect digestion, loss of flesh, and subnormal morning, and slightly elevated afternoon, temperature.

These prodromata may gradually become more pronounced with the supervention of severe pains, marked tympanites, ascites, loss of appetite, emaciation and sometimes diarrhea and exhaustion, or may develop into the caseous variety. Pigmentation of the skin is occasionally observed.

In some cases these symptoms exist for a time and grow worse suddenly; in others the prodromata are mild and overlooked, and acute peritonitis is suddenly developed from a state of apparent health. The temperature goes up rapidly to 102° or 103° F., with general tympanitis, shallow respiration, lancinating pains in the abdomen, great tenderness and sometimes diarrhea. After a few days these symptoms partially subside, and improvement, or apparent recovery, takes place. Sooner or later, however, other attacks follow, and caseous peritonitis or general tuberculosis supervenes.

Pleuritic pains with accelerated respiration, hepatic pains with severe gastric disturbance, or iliac and lumbar pains with preponderance of pelvic disorder, are present in many cases and indicate the area of localization.

4. *Diagnosis.* The prodromata, the gradual onset, and the progressive development suggest the tuberculous nature of the inflammation. The presence of extensive induration about the Fallopian tubes not traceable to labor, abortion or gonorrhea, of encysted ascites and of tuberculous disease elsewhere in the system also aid us materially in differentiating it from peritonitis due to ordinary salpingitis, appendicitis and disease of the gall-bladder. Malignant peritonitis is seldom encysted, is more often connected with

a tumor or characteristic enlargement of an organ, has less extensive acute attacks and a more rapid progress. Tuberculous peritonitis sometimes progresses rapidly, but is then not liable to be confounded with malignant diseases. (See par. 14.)

5. The *prognosis* in the slow form is not necessarily unfavorable, many cases passing into the fibroid stage and ultimately recovering. That of the rapidly developing form is usually, although not invariably, unfavorable.

6. *Treatment.* Tonics, hygienic regulations, a concentrated easily digested diet, such as milk, eggs, the peptonoids, lean meat, rice and cod-liver oil, are indicated in a general way. Peritonitis should be treated by rest in bed, hot fomentations, saline laxatives, and later by counter-irritation over the abdomen with tincture of iodin.

Evacuation of the ascitic fluid by a short abdominal incision and the insufflation of a small quantity of air and iodoform has a better effect than tapping. R. T. Morris claims that the bacteria of putrefaction that enter with the air assist in destroying the tubercle bacilli. Drainage is seldom necessary unless adhesions have been separated that leave oozing surfaces, and then should be accomplished by a glass tube of small caliber, used only until the bloody oozing ceases.

7. **Fibrous Tuberculosis.** Fibrous tuberculosis represents the last stage of the disease in cases that do not result in caseation. The ascitic fluid has disappeared, the adhesions have become dense and fibrinous, and the tubercles have a proportionately small amount of tubercular cellular tissue and a large amount of fibrous tissue. They are from one to three mm. in diameter, hard and usually pigmented.

8. *Symptoms.* The symptoms are usually mild and con-

sist of the prodromata described in par. 3, and often a marked tendency to constipation. Unless the condition is complicated with some other form of the disease, or aggravated by unfavorable influences, the signs and symptoms slowly diminish in severity, and may in time disappear.

9. The *diagnosis* is based upon the mild character of the symptoms, their persistence without becoming worse, and the discovery of tuberculosis elsewhere. There may be slight localized areas of tumefaction in the abdomen, but they are resonant, unaccompanied by ascites, and have not the history of the characteristic acute attacks that precede septic salpingitis, appendicitis or suppuration of the gall bladder, with which they might be confounded.

10. The *prognosis* is favorable with regard to the local condition, but is apt to be unfavorable by reason of the development of tuberculosis in other organs.

11. The *treatment* consists in the ordinary treatment for the tuberculous conditions, and in special treatment of the local symptoms. Bismuth and salol, the digestive ferments and a carefully regulated diet may be required for gastro-intestinal irritability and impaired digestion. Constipation should be combated with mineral waters or other laxatives. Counterirritation over the abdomen by the tincture of iodin, and later gentle abdominal massage and mild faradism may be used. As much out-door exercise should be taken as possible without increasing the local tenderness.

12. **Caseous Tuberculosis.** In caseous tuberculosis the tubercles occur in the same tissues as the miliary form, but caseation, ulceration, agglutination of the peritoneal surfaces, ascites, fibrinous exudation and suppuration take place. The ulceration may give rise to fistulæ between the intestinal coils; or fistulæ may lead from tuber-

cular deposits into the intestines or bladder or outward through the skin, leaving tracks of variable length which show but little tendency to heal. The ascitic fluid may be thin or thick, light or dark colored. It may be general or sacculated. It may be mixed with pus, or be entirely converted into pus; or serum may be found in one place and pus in another.

Local accumulations of fluid, and masses of matted viscera and tuberculous tissue, with a fibrinous exudate on the contiguous peritoneal surfaces are found in most cases. Among the favorite places for such localization are the regions about the uterine appendages, the cecum, the omentum and the liver.

13. *Symptoms.* There is usually a past history of attacks of acute miliary tuberculosis of the peritoneum, although they may not have been diagnosed at the time of their occurrence.

The symptoms are those of the acute miliary form, but are less active in character and more persistent. There is a moderate daily afternoon elevation of temperature and sometimes a slight morning fall, continuing for many weeks, with tympanites, abdominal or pelvic pain, occasional or frequent attacks of diarrhea, vomiting, loss of appetite, emaciation, night sweats and of localized tumefaction or encysted fluid. In old cases acute attacks of peritonitis and the evidences of fistula, or even of intestinal obstruction, may appear.

If the disease is confined to a small area the symptoms assume the form of a localized inflammation, and the general symptoms and impairment in health may be slow in making their appearance.

14. *Diagnosis.* When the disease occurs in connection with tubercular salpingitis, the peritonitis is apt to be con-

nected with ascites, and is more extensive than chronic peritonitis due to septic disease of the appendages. The salpingitis also presents differences (chap. IV, par. 6).

Encysted tubercular peritonitis of pelvic origin may be mistaken for *ovarian tumor*. In addition to the local signs mentioned in part VIII, chap. VI, par. 13, the presence of salpingitis, the induration of the sacro-uterine folds as felt by the finger introduced into the rectum, the slow development, and other signs and symptoms of tuberculosis serve to distinguish it. An ovarian tumor with pelvic adhesions presents severe increasing pelvic symptoms with proportionately less general depression than tuberculosis.

Chronic appendicitis has a history of acute attacks of local inflammation with complete or almost complete restoration of health between attacks, and without the progressive signs and symptoms of either local or general tuberculosis. Abscess about the appendix vermiformis with intestinal fistula is known by the history, and the general symptoms of septic infection without the evidences of tuberculosis in other parts. (See par. 4.)

15. The *Prognosis* is unfavorable, as but few cases are permanently relieved. However, when the disease is localized, it is occasionally cured by surgical interference.

16. *Treatment.* The only hope for a cure is by evacuation of the fluid and removal by abdominal section of the affected tissues, or of such of them as show the disease in an advanced stage. Separation of extensive, firm intestinal adhesions, except such as may be necessary to evacuate encysted fluid, is not advisable on account of the danger of producing an intestinal fistula.

When the appendages are diseased they should be removed, together with as much of the fibrinous exudate or accompanying sac as possible. Drainage will usually be

necessary, but should only be continued until the fluid withdrawn becomes trifling in amount and clear, usually from thirty-six to forty-eight hours. The uterus, if affected, should also be removed.

In some cases the condition of the patient neither permits of grave operative procedures, nor presents sufficient hope of a cure of the tuberculous condition to justify assuming much risk, and we must content ourselves with evacuating the fluid. If it is encysted, such portions of the cyst wall as are not firmly adherent, and all loose fibrinous tissue, should be removed.

PART EIGHT.

MALIGNANT DISEASES.

CHAPTER I.

CANCER AND SARCOMA OF THE VULVA.

1. Epithelioma, fibrous carcinoma, and sarcoma occasionally affect the vulva.

2. **Epithelioma** begins as a small, round prominence on the vulva, more often on the inner side of one of the labia. Its surface is usually roughened by tiny red elevations. As the months pass by the nodule slowly increases in size, the margins assume a livid color and the skin breaks down, leaving an ulcerated surface from which a thin, puriform fluid of disagreeable odor exudes. The base and copper-colored margins of the ulcer are indurated, while granular or papillary excrescences may appear over its surface.

The disease extends over the vulva and surrounding skin, but not into the vagina. The inguinal glands become affected late in its course. It is met with more often in women between the ages of forty and sixty years.

3. *Symptoms and Diagnosis.* Some itching is usually felt, but the nodule often remains unnoticed for a long time, and may be discovered accidentally. Later necrosis of tissue, fetid discharge, local irritation, shooting pains and hemorrhage are noticed. Anemia, septicemia and extreme debility gradually supervene, as in all cases of cancer.

The disease runs its fatal course in about two years.

The diagnosis is made by microscopical examination of the tissue.

4. The *Treatment* in early cases should consist in extirpation of the diseased tissues and suture of the raw surfaces. When the wound cannot thus be satisfactorily closed it may be cauterized with the thermo-cautery. Enlarged inguinal glands should at the same time be extirpated.

If the diseased tissue cannot be entirely removed, the ulcerated surfaces may be scraped and touched with strong carbolic acid, and afterward washed with a 2 per cent. solution of carbolic acid or creolin two or three times daily, and the surfaces dressed with iodoform gauze cut into narrow strips, or with salycilated absorbent cotton. Oxid of zinc ointment mixed with 5 per cent. of carbolic acid may be applied to the surrounding skin to protect it from the discharges and relieve the irritation.

Numerous injections (10 or 12) of a few drops of pure alcohol throughout the infiltrated area have been found to retard the development of the disease. The injections are used every day or two, according to the toleration of the patient. (Schultze, Vulliet.)

5. **Fibrous Carcinoma** appears as one or more nodules in the connective tissue of the labia or about the mouth of the urethra, which lead to general infiltration, ulceration, necrosis of tissue and sometimes to the establishment of small cavities or fistulous tracks. The deeper lymphatics are affected sooner, and pain appears earlier, than in cases of epithelioma. The later symptoms correspond to the later symptoms of epithelioma, and the treatment is the same. This form of the disease is exceedingly rare.

6. **Sarcoma** of the vulva may occur in the form of round-celled or spindle-celled sarcoma, melano-sarcoma or myxo-sarcoma. It may begin in the clitoris or in the

labial surfaces, and grow to be a large projecting tumor, or it may commence deeper in the connective-tissue. The ulcerative, necrotic and septic changes take place the same as in carcinoma, and are associated with the same symptoms. It is apt to attack young women.

The diagnosis is generally made by microscopic examinations of portions removed.

The treatment is the same as for cancer.

The inoculation of cultures of erysipelas (Coley) for malignant disease is still on trial, and may be resorted to after the complete or partial extirpation of the malignant growth from the vulva, if the parts are accessible and the conditions favorable. So far the results have not been as favorable as was anticipated.

CHAPTER II.

CANCER AND SARCOMA OF THE VAGINA.

1. **Cancer** of the vagina is usually secondary to cancer of one of the surrounding organs. As a primary affection it occurs in the form of epithelioma and submucous carcinoma.

Epithelioma of the vagina has been found in children, although one-third of all cases appear after the fortieth year. It usually begins as a circumscribed, projecting nodule on the posterior vaginal wall, which soon breaks down on the surface and assumes the form of a raised, ulcerating, cauliflower-like mass with everted edges. Sometimes it assumes the form of a sessile growth of friable tissue. It spreads into the connective tissue as well as along the surface, and the necrosis that results may give rise to a recto-vaginal fistula.

The *submucous* or *diffuse variety* commences as a flat area of infiltration under the normal vaginal membrane, which spreads along and around the vagina until the latter feels like a narrow opening through a mass of hard, unyielding tissues. Ulceration and excavation sooner or later take place, with a corresponding softening of the parts. The surrounding tissues are early infected.

2. The *Symptoms* are at first confined to a thin, irritating discharge, with more or less itching of the vulva. Before long the discharge becomes offensive, bloody at times, and contains some tissue debris. Pain radiating from the vagina is soon experienced, and sometimes backache and bearing-down sensations. Later the pains connected with infection of the neighboring organs, and symptoms of anemia, septicemia, and extreme debility make their appearance. Uremia from pressure upon the ureters is occasionally observed.

3. The *Diagnosis* of epithelioma from *benign papilloma* is made by the firmness at the base of the ulcer, the friability of the tissue and the odor and character of the discharge. Tuberculous ulcers are not so vascular nor offensive, are not so prone to bleed, and develop more slowly. A microscopic examination of the tissues is often necessary to exclude sarcoma.

Submucous carcinoma is easily recognized by the board-like hardness or the extensive sloughing character of the circumvaginal infiltration, and by the usual symptoms of cancer.

4. *Treatment.* If possible, the diseased tissue should be completely extirpated, together with as much of the underlying connective tissue as possible, and a strip of healthy vaginal wall all around at least a centimeter, ⅓ of an inch, wide. The wound should be cauterized with the thermo-cautery, or with the solution of the acid nitrate of mercury,

or the solution of ferric chlorid three parts and hydrochloric acid one part. I prefer these applications because they penetrate the tissues deeply.

When it is no longer possible to remove all of the tissue, the surface may be curetted and the solution of ferric chlorid be applied once a week if it is tolerated that often. Astringent and antiseptic douches, such as a two per cent. solution of alum, or lead acetate, or 1–1000 solution of potassium permanganate help to diminish hemorrhage, destroy the odor, and prevent septic absorption. Alcohol injections (see treatment of epithelioma of vulva, chap. 1, par. 3) may be tried.

5. **Sarcoma** of the vagina is a rare affection. It usually occurs in the young, seldom in the old. It may attack infants, and is sometimes congenital.

Two forms have been recognized. The circumscribed submucous sarcoma, and the diffuse sarcoma of the vaginal walls.

The *circumscribed submucous* variety usually occurs on the posterior vaginal wall, and may feel at first like a fibromyoma. As it becomes larger it projects well above the surface and ulcerates, and may then resemble a papillary growth. Later, as the tissues undergo extensive necrosis, the disease resembles carcinoma. It is, as a rule, composed of spindle cells.

The *diffuse superficial* variety commences as a small mass in the vaginal wall, which forms a granulating ulcer with raised edges that bleeds easily and extends rapidly.

A microscopic examination is necessary to differentiate the disease from cancer, although its greater tendency to hemorrhage and its occurrence in young subjects often reveal its character.

The treatment is identical with that of cancer of the vagina.

CHAPTER III.

CANCER OF THE CERVIX UTERI.

(*High Amputation of the Cervix. Vaginal Hysterectomy.*)

1. Cancer of the cervix has been observed from the seventeenth year to extreme old age, more often between thirty and fifty. One-third of all cases of cancer in women occur in the cervices of multiparæ. This is explained by the facts that the cervix is so often rendered susceptible to infection by laceration and erosion, and is easily reached by carriers of germs.

FIG 182.—PAVEMENT EPITHELIOMA GROWING UPON ANTERIOR LIP OF CERVIX. (*Schultze.*)

2. **Pathological Anatomy.** Three varieties of cancer are found in the cervix: (1) pavement epithelioma of the vaginal portion, (2) cylindrical epithelioma of the mucous membrane of the cervical cavity, and (3) nodular carci-

noma of the cervical walls. These varieties exemplify the same morbid action in the different structures of the cervix.

FIG. 183.—PAVEMENT EPITHELIOMA GROWING UPON POSTERIOR LIP OF THE CERVIX. (*Schultze.*)

FIG. 184.—PAVEMENT EPITHELIOMA, GROWING UPON BOTH LIPS OF CERVIX, EXTENDING TO VAGINA AND BLADDER. (*Schultze.*)

3. *Pavement epithelioma* (cancroid, squamous epithelioma, cauliflower cancer, mushroom cancer, papillary cancer)

FIG. 185.—MICROSCOPIC SECTION OF PAVEMENT EPITHELIOMA OF CERVIX. (*Ruge and Veit.*)

p. Epithelium of vaginal portion. *k*. Proliferation of epithelial cells extending into glands, *dr*. *kn*. Nest of epithelial cells.

always starts in the pavement epithelium covering the vaginal portion of the cervix, and spreads over the cervix and to the vaginal walls, and may fill the vagina in the form of a mushroom, projecting from one or both lips, before invading the deeper tissues.

FIG. 186.—CYLINDRICAL EPITHELIOMA OF CERVICAL CAVITY IN THE EARLY STAGE. (*Schroeder.*)

Histologically there are two varieties, the lobulated in which epithelial masses lie between the bundles of muscular fibers, and the tubular in which anastomosing cylinders, filled or distended by epithelial cells, extend into the muscular substance. The cells are crowded together and assume cubical and various irregular shapes.

The first change consists in proliferation of epithelial, and submucous infiltration of connective tissue, cells. Then the connective tissue

fibers penetrate the overlying epithelial mass, separate them and finally unite and shut off one or more epithelial cells. The enclosed or isolated cells spread in the direction of the least resistance, viz.: along the lymphatics (Ribbert*) which accompany the blood-vessels (Seelig).

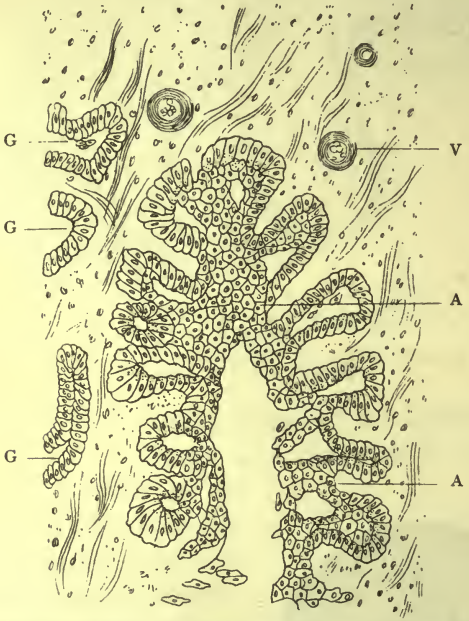

FIG. 187.—MICROSCOPIC SECTION OF COMMENCING CYLINDRICAL EPITHELIOMA OF CERVIX. (*Bonnet et Petit.*)

A, A. A typical transformation of epithelial covering of the arbor vitæ. *G, G.* Normal glands. *V, V.* Vessels.

4. *Cylindrical epithelioma* (ulcerating cancer of the cervix) starts in the mucous membrane of the cervical cavity, and spreads along the surface under the cylindrical epithelium, passing early into the uterine cavity, but remaining for a long time above the external os.

The glands are packed with polymorphous epithelial

* Virchow's Archiv, vol. 135.

cells, which also invade the surrounding connective tissue spaces. Later the inflamed mucous membrane breaks down, leaving an excavated ulcer, and sometimes converting the cervix into a hollow shell.

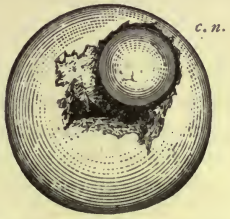

FIG. 188.—NODULAR CARCINOMA OF THE LOWER END OF CERVIX, SITUATED UNDER THE VAGINAL SURFACE. (*Schroeder.*) See Fig. 190.

FIG. 189.—SAME AS FIG. 188, SECTION THROUGH THE NODULE, *c. n.* (*Schroeder.*) See Fig. 190 for references.

5. *Nodular carcinoma* (parenchymatous cancer, atypical epithelioma, circumscribed cancer, cancerous nodule) begins as one or more circumscribed nodules under the normal

FIG. 190.—MICROSCOPIC SECTION OF A PORTION OF PRECEDING FIGURE. *a.* Normal vaginal pavement epithelium. *c. n.* Carcinomatous nodule. Between these the eroded cervical mucous membrane, *e.*

looking mucous membrane, either of the cervical cavity or vaginal portion. They develop in the cervical walls, and

early infect the connective tissue and lymphatics beyond the cervix. They also spread to the uterine walls. Sooner or later softening takes place in a nodule of the enlarged cervix and the mucous membrane over it breaks down, leaving an excavated ulcer. The whole end of the cervix may thus be removed by necrosis.

Microscopic sections show the characteristic structure of carcinoma (Fig. 190) consisting of alveoli surrounded by fibrous tissue and filled with polymorphous cells. Usually the fibrous tissue is abundant and the mass is hard (scirrhus); occasionally the fibrous tissue is scanty, and the cells large and abundant, and the mass is soft (encephaloid.)

6. In the advanced stages it may be difficult to recognize the variety. The necrosis of tissue, particularly in nodular carcinoma and cylindrical epithelioma, may open the rectum, bladder, or both, and convert almost the whole pelvis into one open cavity. The surrounding lymphatics are involved, and the pelvic connective tissue becomes filled with cancerous tissue. The ureters often become compressed and sometimes ulcerated, and hydronephrosis, nephritis and uremia result. The peritoneal cavity is seldom opened, because as soon as the peritoneal surface becomes involved the general cavity is shut off by adhesions. The ovaries, Fallopian tubes and fundus uteri may finally all become affected. The endometrium is usually inflamed, and stenosis of the cervix, with hematometra or pyometra, is occasionally observed.

The disease runs its course, as a rule, in from one to two years.

7. **Etiology.** The prolonged irritation, and pathological changes following laceration of the cervix predispose the parts to carcinoma.

Recent investigations point to a micro-parasitic origin.

8. **Symptoms.** It should be remembered that cancer

often exists for some time before symptoms appear. When they do appear they are not at first characteristic. A slight increase of the menstrual discharge and some leucorrhea, and later a slight occasional bloody flow are the earliest. In some cases the first symptom is a slight flow of blood after coitus, in others hemorrhages do not occur until the disease is far advanced.

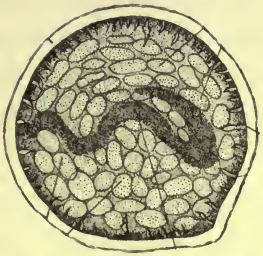

Fig. 191.—Parasite Found in Uterine Carcinoma. (*Vitalis Mueller.*)

9. Soon after the intermenstrual hemorrhages have commenced the vaginal discharge grows thinner and more abundant, and the somewhat disagreeable odor that may have been already noticed, becomes the same as that of decomposing meat. The presence of minute particles of broken-down tissue, and pus or blood debris, give it a color varying from light gray and yellow to dark green or brown. A dish-water appearance is quite common. Later it assumes more of a bloody character, or alternates with discharges of blood.

10. Irritation of the vaginal entrance by the discharges may become troublesome. When the connective tissue around the cervix is invaded, shooting, lancinating pains come on and soon recur daily with increasing severity. They may radiate into the iliac, inguinal or gluteal region, or down the thigh. Still later the pains of peritoneal inflammation, with fullness of the lower abdomen and rigidity of the abdominal walls, supervene. If stenosis of the cervix occurs, colicky uterine pains are produced. As the neighboring organs become affected, symptoms of inflammation in them become prominent, such as dysuria, polyuria, vesi-

cal tenesmus, constipation, rectal tenesmus, mucous discharges from the rectum, and septic diarrhea.

11. Indigestion, anemia, and septicemia gradually make themselves evident, giving the patient a cachectic appearance. The skin is yellowish, dry, and often wrinkled, the sclerotic and conjunctiva are pearly white and the expression of the face is dull. Uremia may develop gradually and render the patient stupid, and benumb her sensibilities so that she scarcely realizes her terrible condition.

Hemorrhage, peritonitis, uremic coma and gradual failure of the vital powers are the ordinary modes of death.

12. **Diagnosis.** The diagnosis, to be of benefit to the patient, must be made early.

Pavement epithelioma is known by its projection on a broad base from the vaginal portion of the cervix. The surface is rough, irregular, hard and friable, and feels somewhat like the surface of a raw cauliflower. It is of a dirty, grayish-yellow color, and is usually moistened with a mucopurulent, foul-smelling fluid.

The non-ulcerated diseased surface of epithelioma has a congested, bluish-red color with light gray patches scattered over it, corresponding to conglomerations of cells ready to break through. The ulcerated portion has sharply-defined edges and a dull, mottled, granular-looking surface, containing yellowish-gray areas interspersed with red vascular spots containing visible blood-vessels. One or more of these vascular spots become bloody when the parts are wiped off.

It has on account of its hardness been mistaken for a large, ulcerated or sloughing fibroid of the cervix. But a large, cervical fibroid is not so rough, hard and friable; it is smooth, more or less elastic to the touch, and will not crumble on the surface even under firm pressure. It is tougher of fiber and more elastic, but does not feel so hard upon gentle palpation.

A large, sloughing, intrauterine fibroid protruding through the

dilated cervix simulates cancer, but this kind of fibroid has an additional characteristic that clears the diagnosis, viz.: the thin rim of the dilated cervix around its upper part. On the other hand, the undilated os can be found usually before, behind, or at the side of the malignant cauliflower growth. (Figs. 193 and 195.)

Bilateral laceration of the cervix with eversion of both lips (Fig. 192) gives the cervix a somewhat mushroom shape, but the edges are thinner than those of pavement epithelioma, and the projections are in front and behind, with lateral depressions corresponding to the laceration. Epithelioma is on one wall or extends part-way round, displacing the os from the center, and the surface is softer, and darker red.

13. *Nodular carcinoma* of the cervix in the beginning is difficult to differentiate from a cervical fibroid. A fibroid which has a capsule is not so intimately attached to the surface, and is not surrounded by infiltrated and vascular tissue as is cancer. The friability and vascularity are easily ascertained by hooking a tenaculum into the nodule. It will immediately tear out and cause abundant bleeding from cancerous tissue, but will hold firmly in a fibroid tumor. Later the excavated ulcer with abrupt edges, characteristic discharge and surrounding vascular area reveal the cancerous condition.

The enlargement usually extends above the vaginal junction. A supravaginal globular thickening of the cervix that does not interfere with the passage of the sound in a person over 30 years old is nearly always due to nodular carcinoma. A supravaginal cervical fibroid which does not interfere with the cervical cavity projects more distinctly upon the peripheral cervical walls. (Figs. 194 and 196.)

14. *Cylindrical epithelioma* does not differ in appearance from severe cervical endometritis until commencing necrosis of tissue and ulceration occurs. Even when the cervix is excavated the vaginal portion may appear normal, excepting a narrow line of vascularity at the edge of the external os. The sound introduced detects the excavation.

and brings out the characteristic foul-smelling discharge and debris, or starts a hemorrhage.

All cases of enlargement of the cervix and bad forms of cervical catarrh should lead us to suspect carcinoma, and, if there remains any uncertainty, to dilate the external os and excise some of the diseased tissue for a microscopic examination.

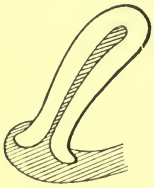

FIG. 192. — RELATION OF OS AND VAGINAL FORNICES TO LACERATED AND EVERTED CERVIX.

FIG. 193.—RELATION OF OS AND VAGINAL FORNICES TO PAVEMENT EPITHELIOMA OF VAGINAL PORTION.

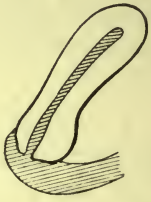

FIG. 194.—RELATION OF OS AND VAGINAL FORNICES TO NODULAR CARCINOMA OF CERVIX.

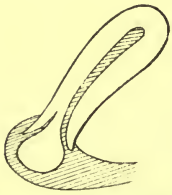

FIG. 195.—RELATION OF OS AND VAGINAL FORNICES TO PROJECTING UTERINE FIBROID.

FIG. 196.—RELATION OF OS AND VAGINAL FORNICES TO SUPRA-VAGINAL CERVICAL FIBROID.

Certain early symptoms point to carcinoma. Thus the return of a bloody flow from the uterus some years after the menopause; hemorrhage after coitus from a uterus supposed to be healthy; the steady recurrence of slight hemorrhages at frequent intervals between menses, and without apparent cause, in a woman over thirty years old. On the other hand extreme youth, or a continuance of the condition for two years or longer without getting much worse, would almost exclude cancer.

15. Carcinoma before ulceration is to be differentiated from erosion with enlargement of the cervix. The surface

over cancer tissue without ulceration is more yellowish in color than the deeper red erosion, and may be covered with glistening bright red granules (Stratz). The surface in the condition of erosion is velvety or elastic, instead of hard and board-like or friable. If nodules are felt, or lighter colored elevations like superficial cysts are seen, they should be punctured to ascertain whether they are follicles or solid nodules. In the first condition a thick mucus will be expelled, in the latter brisk hemorrhage will ensue. Cystic follicles of appreciable size are seldom found within the diseased area of cancer. However, a badly inflamed cervix with considerable enlargement, that cannot be traced to cystic degeneration, should be suspected, and some of the tissue be examined microscopically.

It is important to determine whether the malignant disease has passed into the surrounding connective tissue. When the cervix is fixed in the pelvis, or hard tissue can be felt extending from the cervix toward the pelvic wall, such is usually the case. Palpation per rectum reveals the enlarged lymphatics, or the solid masses extending from the cervix. The bimanual rectal examination sometimes enables us to detect adherent appendages on the sacro-uterine and broad ligaments, and, at the same time, establish the freedom of the connective tissue around the cervix from infiltration, even when the uterus is more or less fixed by these old adhesions.

16. The **Prognosis** is usually bad even with operative interference Could the disease be discovered more often in the earliest stages, *i. e.*, before the symptoms appear, it would usually be possible to remove all of the affected tissue. When the pelvic connective tissue or lymphatics are invaded, or when the entire thickness of the cervix is involved, a permanent cure cannot be expected, until some specific for cancer shall have been discovered.

17. The **Treatment** generally recommended at the present day consists in total extirpation of the uterus by

way of the vagina. A few authorities (C. Schroeder, M. Hofmeier, Reeves-Jackson, W. H. Byford, and others) have maintained that in certain selected cases high amputation is not only less dangerous, but fully as effective. Since pavement epithelioma spreads along the pavement epithelium rather than toward the uterine cavity, it is probable that a properly performed amputation of the cervix will, in the near future, be demonstrated to be equally effective for cases of this kind in the earlier stages. The danger of infection of the endometrium during the operation can be obviated by curetting and cauterizing the endometrium.

For cylindrical epithelioma and nodular carcinoma of the cervix total extirpation is, according to our present knowledge, the only treatment.

18. *High Amputation of the Cervix.* The steps of high amputation of the cervix for beginning pavement epithelioma are as follows :—

The patient is prepared in the ordinary way (part 1, chap. 11). She is placed in the dorso-sacral position (Fig. 3). The vagina is thoroughly douched with a 1–2000 solution of corrosive mercuric chlorid, and the external parts, from which the hair has been clipped, are scrubbed thoroughly with the same. The vagina is held open by retractors, the cervix grasped by vulsella, the cancerous tissue curetted away, and the resulting wound disinfected with strong carbolic acid. The vagina is then again douched out with the corrosive mercuric chlorid solution. The uterus is now gently curetted with a sharp curette, douched out with sterilized water, swabbed out with strong carbolic acid, and again douched out with plain sterilized water.

A curved incision is then made, anteriorly and laterally, a little over half way around the cervix on the vaginal

wall about half an inch (1.5 cm.) away from the diseased tissue. While the cervix is pulled down as near the vaginal entrance as possible, the bladder is separated from the uterus by the finger nail or knife handle for half or two-

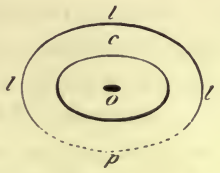

FIG. 197.—HIGH AMPUTATION OF CERVIX. (SCHEMATIC.)

o External os uteri. *c*. Circumference of cervix. *l*, *l*, *l*. Anterior vaginal incision (heavy line). *p*. Posterior vaginal incision (interrupted line)

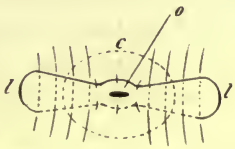

FIG. 198.—CERVIX AMPUTATED. (SCHEMATIC.)

Vaginal edges united to the endocervical mucous membrane. Lateral sutures passed but not tied.

Same lettering as preceding figure.

thirds of an inch, or two centimeters. The incision is then carried completely around the cervix posteriorly, and the connective tissue separated from the posterior surface of the cervix for about the same distance upward. If the peritoneal cavity is opened it is immediately closed with a continuous catgut suture. The connective tissue is then snipped on either side with scissors almost to the point where the uterine artery can be felt beating. With an aneurism needle a ligature of medium-sized silk is carried through the connective tissue above the artery, from before backward, and brought out, guided by the forefinger of the left hand placed behind the artery. The artery is then tied and the thread cut short. The other side is similarly tied, and the tissues between the ligatures and the uterus severed as high as the separation has been carried anteriorly and posteriorly. If any vessels about the sacro-uterine or broad ligaments bleed they should be caught with forceps and tied with fine silk. The cervix is now cut squarely off as high as liberated from the surroundings.

After all active hemorrhage is checked, the wound is douched out with the corrosive mercuric chlorid solution, and the middle of the anterior vaginal edge is united to the mucous membrane of the cervix by two or three silkworm-gut sutures, which gather up any loose connective tissue under them and take a small hold on the cervical tissue next to the mucous membrane. The same is done posteriorly. The gap left on either side between the vaginal edges is then closed with silkworm-gut sutures, which also pass superficially through the exposed surface of connective-tissue. (Fig. 198.)

19. The vagina is douched out with the 1–2000 solution of corrosive mercuric chlorid, and loosely packed with strips of iodoform gauze about two inches (5 cm.) wide. The gauze should be removed on the third day, and a vaginal douche be given of the corrosive chlorid solution, after that a douche of one per cent. solution of carbolic acid twice daily.

The patient should urinate or be catheterized every six or eight hours, and the vulva and vaginal entrance be immediately washed off. If the patient cannot urinate lying down, she should be catheterized for forty-eight hours, but after that may be raised to a sitting posture on a bed-pan. The sutures should be left for two weeks.

The instruments needed are vaginal and perineal retractors, long-handled scissors (sharp pointed and curved on the flat), a knife, an aneurysm needle, vulsella to hold the cervix, two tenacula to hold the stump and hook down the vaginal edges, sponge-holders, a sound for the bladder, needle forceps, half-curved needles about an inch or a little over two centimeters long, silk and silkworm-gut.

A silk suture through the lower end of the cervix can be advantageously made to take the place of the vulsella when the vaginal entrance is narrow. If the sacro-uterine ligaments prevent the cervix from being brought down, their lower edge can be ligated after the ligation of the uterine arteries, and the uterus be severed from them.

20. *Vaginal Hysterectomy.* The steps of total extirpation of the uterus per vaginam are as follows :—

The patient is prepared for a peritoneal section (see part I, chap. II and III). The final disinfection on the operating table is the same as for high amputation (par. 18), excepting uterine curettage. The same vaginal incisions are made, but the bladder is separated until the peritoneal cavity is opened widely. The separation of tissue behind the cervix is continued until the cul-de-sac of Douglas is opened, when a sponge the size of a goose-egg, attached to a string, is pushed into it.

The ligation of the uterine artery (par. 18), is guided by the finger in the peritoneal cavity behind the broad ligament. The ligature passes backward through the left broad ligament into the peritoneal cavity, and when brought out below includes also the sacro-uterine ligament. After being tied, the same thread is again carried through the broad ligament higher up, tied again, and the tissues are cut between the ligature and the uterus. The right broad ligament is similarly tied and cut in sections until the uterus on that side is entirely separated. Then the remaining upper portion of the left ligament is tied and severed, and the uterus removed. The anterior and posterior peritoneal edges are drawn over the connective tissue with a tenaculum, and stitched to the vaginal edges with a continuous catgut suture, so as to cover the raw tissue, and check the bleeding from the vaginal edges. Oozing from the lateral angles is similarly checked with catgut sutures. The blood is sponged out, and the pelvic peritoneal cavity thoroughly irrigated with a 0.6 per cent. solution of chlorid of sodium in sterilized water. The stumps are now pulled down by means of the long ligatures, and sutured extraperitoneally to the vaginal edges either so as to close the peritoneal

cavity, or (as I prefer) united to each other in the vaginal wound without entirely closing the cavity. Bleeding points in the connective tissue may be controlled by stitching the peritoneal and vaginal edges together over them. The vagina should be loosely packed with strips of iodoform gauze 5 cm., or two inches wide, the end of which, if the peritoneal cavity be not closed, extend between the vaginal edges as far as the constricted portions of the stumps. The gauze is left in place four days. The ligatures may be allowed to slough off, which they ordinarily do in two weeks.

21. The patient urinates or is catheterized every six or eight hours, and is kept on her back for forty-eight hours, when she may be allowed to lie in any position. After the gauze is removed the vagina is douched twice daily with a 1 per cent. carbolic, or creolin, or lysol solution. The diet is the same as after other peritoneal sections (see part 1, chap. VI). During the third week the patient may eat her meals with a bed-rest, and may sit up out of bed a short time each day toward the end of the week.

FIG. 199.—THE AUTHOR'S BROAD LIGAMENT FORCEPS.

22. When the vagina is small and the uterus cannot be pulled down, it may be impossible to tie the broad ligaments securely, or to tie them quickly enough. In such cases they may be rapidly clamped with forceps. A short

strong pair is put on the base of the broad and sacro-uterine ligaments, on each side, and the tissues cut as high as the forceps reach. A long pair of broad ligament forceps is placed upon the remainder of one side and the uterus cut loose on that side. Another pair is placed on the other side, the ligament severed, and the uterus removed.

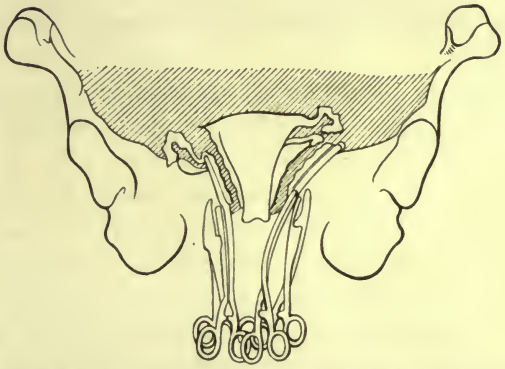

FIG. 200.—FORCEPS APPLIED TO BROAD LIGAMENTS AND UTERUS CUT LOOSE. On the right the tube and ovary are supposed to be removed with the uterus, on the left the tube and ovary are not to be removed.

The gauze packing should extend into the bottom of the cul-de-sac of Douglas and up along the stumps, but not beyond them, nor between intestinal loops.

In both methods the omentum, if within easy reach, should be pulled down between the stumps and intestines to prevent intestinal adhesions forming.

The forceps should be taken off in forty-eight hours, but the gauze be left for four days. In other respects the case may be treated as after ligation.

Operation with ligatures leaves the parts in better condition for recovery after the operation; operation with forceps is quicker and thus easier both for the surgeon and patient, but does not leave the

parts in as good a condition for subsequent recovery. After beginning with ligatures it may be necessary to finish with forceps.

The instruments required are: one perineal and two vaginal retractors, a knife, a pair of long-handled scissors, an aneurysm needle, a sound for the bladder, several hemostatic forceps, vulsella, broad ligament forceps, sponge holders, a needle holder, short straight or half-curved needles for suturing of oozing surfaces, and a tenaculum. Iodoform gauze, irrigating bags, plain and antiseptic solutions, etc., should be provided as for other peritoneal sections.

23. The palliative treatment is the same as that of cancer of the vagina.

24. Cancer of the cervix *complicated by pregnancy* calls for a vaginal hysterectomy when the uterus is small enough to be thus removed. If the pregnancy has gone so far that such is impossible, abortion may be induced and the uterus be extirpated per vaginam at the same time or subsequently. When the fetus becomes too large to be delivered through the cervix, it should, as soon as viable, be removed by one of the following methods: If the condition of the patient is good, a Cesarean section, followed immediately by a total extirpation; if her condition be not good enough, a supravaginal amputation (Porro's operation); if the pelvic tissues do not adapt themselves to this, a Cesarean section, followed by a vaginal hysterectomy during the puerperium.

When the disease has advanced too far for radical treatment, the pregnancy should be allowed to go to term and the child be delivered by Cesarean section.

If the pregnancy has begun after the disease is far advanced, and there is no hope of the development of the fetus to the viable condition, it is better to induce abortion as soon as possible.

CHAPTER IV.

CANCER OF THE CORPUS UTERI.

1. Cancer of the body of the uterus is a rare disease, and usually affects women at or after the menopause.

It occurs in two forms, as an epithelioma developed superficially in the endometrium, and as an adeno-carcinoma, or malignant adenoma.

Nodular carcinoma may be developed at the internal os, and is then practically the same disease as nodular carcinoma of the cervix.

FIG. 201.—EPITHELIOMA OF THE ENDOMETRIUM. (*Schroeder.*)

FIG. 202.—MICROSCOPIC SECTION FROM FIG. 201. (*Schroeder.*)

2. **Pathology.** Epithelioma assumes the form of a diffuse growth of villi on the mucous membrane, and consists of an atypical development of epithelial cells of different sizes, ranging from the normal to that of decidual cells.

The diseased tissues finally break down and convert the uterus into an ulcerated cavity.

Adeno-carcinoma develops within a polypoid glandular mass, and in addition to the lesions of chronic metritis is composed of anastomosing tubules filled with cells. The superficial layer of cells is of the cylindrical variety, while polyhedral and sometimes pavement cells are found in the deeper layers. (Breisky.) The interior of the mass also contains alveoli lined with one or two layers of epithelial cells, as well as cavities containing mucus and free cells. The structure is similar to tubular pavement epithelioma found elsewhere, except that numerous cylindrical epithelial cells are present.

In both forms the muscular layers of the uterine walls gradually become infiltrated as the disease advances, and metastatic nodules are formed in the walls and in the broad ligaments. When the disease reaches the peritoneal surface, adhesions and secondary growths take place in and among the surrounding organs. The cancerous changes do not pass the internal os until quite late in their progress.

3. Of the **Causes** little more can be said than that its occurrence is favored by long-standing endometritis, particularly of the fungus or polypoid variety (adenoma), and that a micro-parasite is probably responsible for its development (Fig. 191).

4. **Symptoms.** The symptoms are hemorrhage and watery discharges, which soon assume a distinctly fetid odor, and become more or less purulent and mixed with granular debris.

The pains and symptoms of uterine inflammation are often noticeable, and characteristic uterine colicky pains are apt to come on at irregular intervals after the uterine cavity has become filled with the mass of degenerated tissue.

Later the pains are peritoneal in character and almost constant. They spread to the iliac, inguinal and abdominal regions, and are accompanied by enlargement, tenderness and rigidity of the lower abdomen.

The general symptoms are the same as those of cancer of the cervix (chap. III).

5. **Diagnosis.** In the early stages the diagnosis may be difficult, particularly if the hemorrhage and offensive discharge are late in showing themselves.

The cervix appears normal at first, but in a few cases becomes dilatable to such an extent that the finger can penetrate and feel the soft tissue.

The corpus uteri as palpated bimanually is larger and rounder than normal, and often gives a characteristic soft-elastic sensation to the vaginal touch. The sound usually detects the softened mass and causes some bad-smelling particles to be expelled with fresh blood.

The age of the patient, the previous history and the character of the tissue obtained by the curette will differentiate abortion with retained secundines.

When the symptoms point to the disease a sharp curette should be introduced and some of the tissue gently removed for microscopical examination. This should be done in all cases of hemorrhagic endometritis in patients over forty years old.

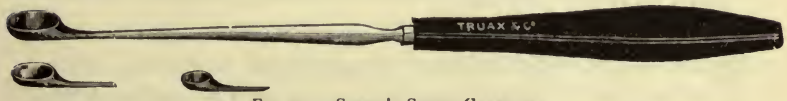

FIG. 203.—SIMON'S SHARP CURETTE.

6. **Prognosis.** If the disease is discovered before the peritoneal surface or broad ligaments show signs of infection, the prospect of a cure may be considered as good.

7. **Treatment.** The only radical treatment is a total

hysterectomy. This can usually be done by way of the vagina (chap. III, par. 20), but if not, by celiotomy or Kraske's sacral method.

Kraske's method consists in removing the coccyx and lower portion of the sacrum, pushing the rectum to the left, and opening the peritoneal cavity at the cul-de-sac of Douglas.

Curetting is never curative, but may be resorted to as a palliative measure when, for any reason, the uterus cannot be removed. The sharp curette should be used because it can be made to thoroughly remove the softened tissue without exerting much pressure, and therefore with less danger than the dull curette of perforating the uterine walls, which are apt to be friable.

CHAPTER V.

SARCOMA OF THE UTERUS.

1. Sarcoma of the uterus is much more rarely observed than carcinoma. It occurs at any age, but most frequently between thirty and forty years.

Three distinct varieties have been described: papillary sarcoma of the vaginal portion, sarcoma of the endometrium, and fibro-sarcoma of the uterine walls.

2. **Papillary Sarcoma of the Vaginal Portion.** Papillary sarcoma of the vaginal portion usually contains round-celled, spindle celled, and normal connective tissue, and has a characteristic edematous papillary structure, corresponding to the normal papillary nature of the surface from which it develops. The mass is soft in consistence and grows to a large size, often filling the vagina and exerting pressure upon the urethra and rectum. It takes the form of irregular polypoid masses, sometimes not unlike a bunch of grapes. (Sarcoma botryoides.) The disease spreads

along the mucous membrane into the uterus and to the vagina, and finally invades the pelvic connective tissue and peritoneum.

3. The early *symptoms* are hemorrhage and irritating discharges, which become purulent and increasingly offensive. Anemia rapidly supervenes. Retention of urine, constipation, and other symptoms of pressure upon neighboring parts may develop, accompanied either by protrusion of the end of the blackish-red mass, or even by expulsion of portions of it. Toward the end pelvic pain extending up into the peritoneal cavity, and sciatic pains, are noticeable. Death ensues from anemia and exhaustion, sometimes from peritonitis.

4. In the early stages a microscopic examination is necessary to distinguish sarcoma from cancer. Later the large size and soft edematous character, papillary conformation, blackish-red color and evidences of pressure on the urethra are distinctive.

5. The *prognosis* is unfavorable unless the disease is subjected to treatment in the early stages.

6. The *treatment* consists in vaginal hysterectomy (chap. III, par. 20). The tendency of the disease to spread along the mucous membrane of the cervix would render an amputation of the cervix useless except in the very beginning.

When it is too late for radical measures, the diseased tissues may be curetted away, the cervix swabbed off with the solution of ferric chlorid, and the vagina douched out two or three times daily with antiseptic and astringent solutions. The application of the iron may be repeated every four or five days as long as softened tissue is found.

7. **Sarcoma of the Endometrium.** Sarcoma of the endometrium is usually of the round-celled variety, and is developed from the connective tissue of the mucous mem-

brane. It is ordinarily a diffuse papillary growth, but is sometimes circumscribed. It originates above the internal os, but may, in exceptional cases, begin in the cervix.

It grows in projecting ridges of light gray, soft, brain-like substance of great capillary vascularity, with knobby and flat projections. The tissue does not break down as readily as that of epithelioma, and is apt to fill the uterus,

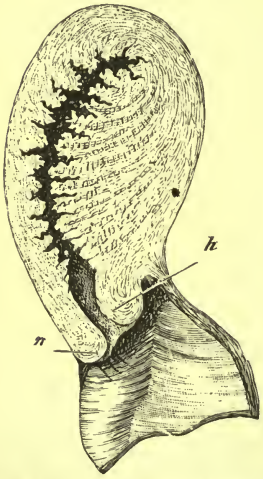

FIG. 204.—DIFFUSE SARCOMA OF THE ENDOMETRIUM. (*Winckel.*) *n.* Anterior lip. *h.* Posterior lip.

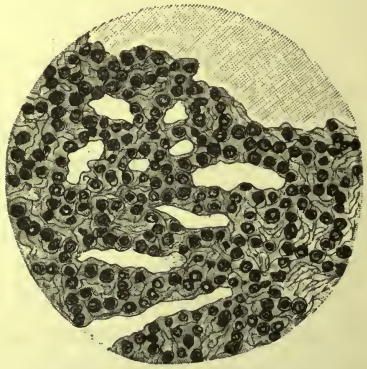

FIG. 205.—ROUND-CELLED SARCOMA. (*Winckel.*)

and may even project through the internal os. The uterine walls are hypertrophic, but as they are gradually invaded by the destructive process they may become a mere shell (filled with the brain-like mass) before the disease reaches the peritoneal surface and causes adhesions and infection of neighboring organs. Metastasis may not take place until the uterine walls have become extensively diseased. There is a class of cases in which the mucous membrane breaks

down rapidly without proliferation and vegetation, leaving an ulcerated surface. (Terrillon.) The elements of both sarcoma and cancer have been found in the same growth.

Another rare variety, sarcoma deciduo cellulare, or decidual sarcoma, has recently been described. It is developed soon after parturition or abortion in the placental remains and decidua, and is composed of polymorphous decidual cells and giant cells imbedded in connective tissue. The structure has the appearance of multitudinous interlacing villosities, proliferating without limit in all directions. (Gottschalk.)

FIG. 206.—DECIDUAL SARCOMA OF FUNDUS UTERI, A PORTION OF THE POSTERIOR WALL REMOVED. (*Gottschalk.*)

8. The *symptoms* are a watery discharge, menorrhagia, and later profuse hemorrhage. At first the discharge has a disagreeable odor similar to that connected with child-birth, and is pinkish at times, but it soon becomes sanious and fetid. Uterine colicky pains, dilatation of the cervix, and protrusion of the sarcomatous tissue are not uncommon. Anemia, septicemia, pelvic pains and about all of the symptoms of cancer of the cervix present themselves in the later stages.

9. The *physical signs* are similar to those of epithelioma

of the endometrium (chap. IV, par. 5), and the differential diagnosis must usually depend upon the microscopical examination. The patency of the cervix and the whitish, brain-like appearance of the tissue brought out by the finger or the curette, together with the preponderance of profuse hemorrhages over other symptoms, indicate the nature of the affection. In very young women sarcoma rather than epithelioma would be suspected.

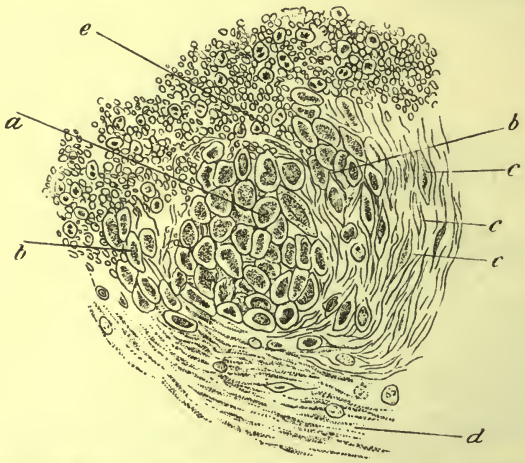

FIG. 207.—MICROSCOPIC SECTION OF DECIDUAL SARCOMA. (*Sanger.*)
a. Nest of decidua cells, resembling a cancer alveolus. *b*, *b*. The same in process of formation. *c*. Intermuscular connective tissue. *d*. Muscular fibers. *e*. Extravasated blood.

10. When seen in the early stages the disease may often be cured, as it often remains for a long time confined to the uterus. Decidual sarcoma, however, usually runs its course in a few months, metastasis appearing within a few weeks.

11. The *treatment* is the same as for epithelioma of the uterus. When the uterus for any reason cannot be removed, dilatation of the cervix, curettement, and the free application of the solution of chlorid of iron or a fifty per

cent. solution of chlorid of zinc to the endometrium may be of palliative value.

12. **Fibro-sarcoma of the Uterine Walls.** Fibro-sarcoma of the uterus (sarcoma of the uterine parenchyma, sarcoma fibrosum) resembles, in many characteristics, fibro-myoma. It is ordinarily submucous, but may be interstitial or subserous. It occurs, as a rule, in nodules of a white, smooth, glistening tissue, composed of round and spindle cells, but sometimes assumes the form of a diffuse infiltration of spindle cells. The submucous tumors frequently become polypoid, and usually show the structure of fibroid polypi together with the cells of sarcoma. In some instances fibro-sarcomas are fibroid tumors that have undergone degeneration. They are intimately connected with their surroundings instead of having loose capsules like the fibroids, and give rise to metastatic growths, sometimes in distant parts of the body. They show but little tendency to disintegrate, and may attain to a considerable size. Occasionally cystic degeneration takes place, producing cysto-sarcoma. Fibro-sarcoma originates in the cervix in rare instances only.

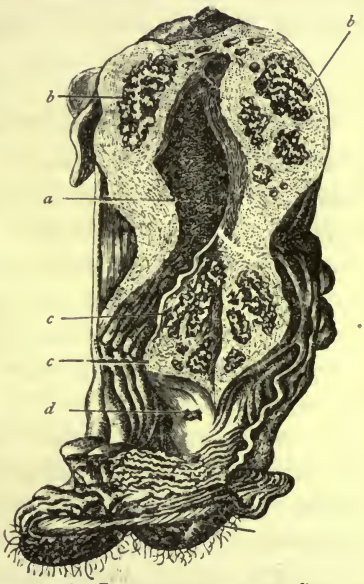

FIG. 208.—FIBRO-SARCOMA OF THE BODY OF THE UTERUS. (*Winckel.*)

a. Uterine cavity; deposits of sarcoma are seen in the uterine walls at *b*, *b*, in the cervix at *c*, *c*, and in the vagina at *d*.

13. The *symptoms* in the early stages are the same as

those of fibro-myoma. Menorrhagia, later metrorrhagia, and a watery, pinkish discharge, which, as the disease advances, becomes purulent and offensive, are generally observed. Pain is a late symptom. As ulceration progresses the symptoms resemble those of cancer of the uterus, except that the sarcomatous uterus is often larger. The disease may run its fatal course in a few months, but often it lasts several years.

14. Rapid growth and foul-smelling discharges distinguish it from fibro-myoma. From cancer, on the other hand, it is known by the comparatively slow growth, and frequently by its larger size. A sloughing fibroid may sometimes be distinguished by the previous history of the fibroid, with the sudden supervention of the septic symptoms. A microscopic examination may be necessary.

15. The *prognosis* is the same as that of other malignant diseases, viz. : fatal, unless it is removed early. The progress is slower than that of sarcoma of the endometrium, but metastasis, by way of the circulation to neighboring and distant organs, is liable to occur in advance of serious symptoms.

16. The entire uterus should be removed by vaginal hysterectomy, if such be practicable, otherwise by abdominal section (chap. III, par. 20 to 22).

CHAPTER VI.

MALIGNANT DISEASES OF THE FALLOPIAN TUBES.

1. Primary carcinoma and sarcoma of the Fallopian tubes were, until recently, almost unknown, but reports are

constantly becoming more numerous of their discovery on the operating table.

They were formerly not discovered because microscopic examinations of ablated appendages were so often neglected, and because the disease has usually extended to the surrounding organs before death, and hence the post-mortem examination does not reveal the place of origin.

2. **Pathology.** *Carcinoma* of the tube is usually primary, or occurs as an extension from the endometrium along the mucous surfaces, and presents the same histological character as epithelioma of the endometrium. The tube is seldom invaded by way of the lymphatics nor from the ovary, until the later stages of carcinoma of the surrounding organs.

3. *Sarcoma* has been observed as round-celled, spindle-celled and melano-sarcoma. (Chas. Dixon Jones.) Primary sarcoma is usually preceded or accompanied by salpingitis, peri-salpingitis, pelvic peritonitis and cyst-formation. It resembles, macroscopically, primary carcinoma of the tube, but its papillary conformation corresponds to the ordinary form of sarcoma of the vagina. (Sanger.) Spots of coagulation necrosis were found in the deeper layers of specimens prepared by Sanger.

The tube is usually enlarged from the size of the finger to that of a small intestine, and filled with papillary growths. Sooner or later the walls also become infiltrated, and finally the peritoneal covering and surrounding organs. The vascularity is great, but of a capillary nature.

Jones asserts that rupture of the distended tube is apt to occur, accompanied by hemorrhage simulating that of extra-uterine pregnancy.

4. The **Symptoms and Signs** are mainly those of salpingitis and pelvic peritonitis, often with cyst formation that

gives rise to the physical signs of ovarian tumor. Pelvic pain, occasional or constant watery uterine discharge of pinkish or brownish color, and the general symptoms of malignant disease, are the ordinary symptoms. Pelvic hematoma or fatal intraperitoneal hemorrhage in long-standing cases of disease of the appendages might be added as an occasional symptom. (Jones.)

5. The **Diagnosis** can seldom be made from malignant disease or papilloma of the ovary. The uterine discharge and the general debility or cachexia point to malignant disease, while the negative character of exploratory uterine curettage excludes malignant disease of the uterus.

If there is cyst formation, aspiration per vaginam will stop the uterine discharge for a week or two, when it will gradually commence again (one personal observation). The aspirated fluid is usually thin and tinged with blood.

6. The **Treatment** consists in removal of the appendages, and if the uterus is affected, also of the uterus.

The author recently removed in one case the uterus per vaginam and as much of the cyst wall as possible, with complete relief of symptoms up to the present time, three months. It is supposed that the large gauze packing caused necrosis and discharge of the remaining portions of the cyst wall.

CHAPTER VII.

MALIGNANT TUMORS OF THE OVARY.

1. The malignant tumors of the ovary, not described elsewhere, are sarcoma, endothelioma and epithelioma.

2. **Sarcoma** of the ovary is usually of the spindle-celled

variety, occasionally of the round-celled. The former is of about the density of an edematous uterine fibroid, the latter much softer. It is globular or ovoid, and smooth on the surface, which may, however, be irregular on account of the projection of cysts. The growth is vascular and sometimes cavernous, and may attain the size of a five- or six-months pregnant uterus.

It occurs as a pure sarcoma, a fibro-sarcoma, a myxo-sarcoma, an adeno-sarcoma, or carcino-sarcoma, and sometimes undergoes fatty or calcareous degeneration. Small extravasations of blood in its substance, suppuration, or even gangrene may follow a twisting of the pedicle or injury during labor.

They occur by preference in young people, and are sometimes found at birth. Both ovaries are apt to be affected.

The *prognosis* is ordinarily unfavorable, yet the tumor does not always recur when removed early.

The *diagnosis* is the same as given for ovarian fibroma (part 9, chap. VI, pars. 11 to 14).

The *treatment* consists in an early removal by abdominal section.

3. **Endothelioma** of the ovary (Golgi) consists of a proliferation of the endothelium of the lymphatics and blood-vessels, and a transformation of the connective tissue elements into epithelioid cells, and possesses both the characteristics of sarcoma and carcinoma. It is found in certain degenerated dermoid cysts, in papillary cysts, and in those solid tumors riddled with small cavities which have hitherto been classed with sarcomata. (Pozzi.)

It possesses the clinical characteristics of the other solid malignant tumors of the ovary and should be treated as such.

4. **Cancer of the Ovary.** Excluding ovarian cystomas

that have undergone carcinomatous degeneration, carcinoma of the ovary is a rare affection, although it is met with more frequently than other solid tumors of the ovary. It may affect the young as well as the old, and is apt to occur on both sides.

5. It is met with in two forms: (1) a diffuse infiltration of the ovary originating in the epithelium of the follicles of Pflueger's ducts, and (2) a superficial development from the germ epithelium.

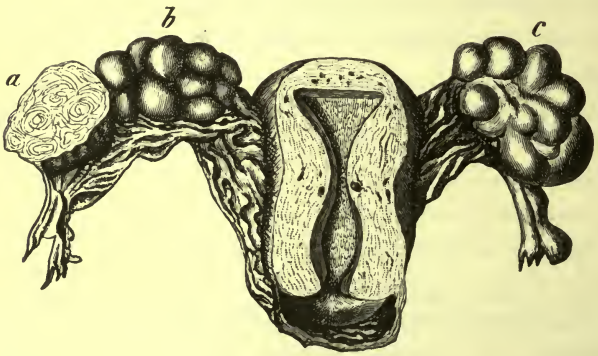

FIG. 209.—BILATERAL GLANDULAR CARCINOMA OF THE OVARY. (*Winckel.*)
a. Section of the growth. *b*, *c*. Nodulated surfaces of growths.

In the former the ovary retains its shape for a long time, except that the surface becomes nodular. It may attain the size of an adult's head, and varies from a scirrhus to a medullary or alveolar character. The pedicle and broad ligament becomes infiltrated sooner or later.

In the latter variety a dendritic growth appears on the surface of the ovary that, in the later stages, cannot be distinguished from papilloma of the ovary, and which rapidly infects the surrounding peritoneal surfaces.

The irritation exerted upon the peritoneum is apt to

cause an abundant ascitic effusion, which is often tinged with blood.

6. The *symptoms* do not, in the beginning, differ from those of ordinary ovarian disease causing enlargement. Later the ascites, rapid growth, symptoms of mild localized peritonitis, impaired nutrition, and cachexia are characteristic. Tympanites and diarrhea not infrequently result from infection of the mesenteric glands.

7. The *diagnosis* is based upon the blood-tinged ascites about the tumor, infiltration of the broad ligament, nodules about the recto-uterine cul-de-sac, local pains, cachexia, and by its frequent bilateral manifestation.

8. The *treatment* in the early stages consists of an oophorectomy. When the broad ligament and cul-de-sac are affected, tapping to relieve the pressure, and general symptomatic treatment, are all that is indicated.

PART NINE.

TUMORS OF THE FEMALE GENITAL ORGANS.

CHAPTER I.

FIBROMA, MYOMA, FIBROMYOMA. (FIBROIDS)

(Fibroid Tumors of the Vulva and Vagina.)

1. Fibromata are found in the urethra, vagina, uterus and ovary, but are of rare occurrence. Myomata and fibromyomata, on the other hand, are very frequently developed in the female genitalia, and may grow from any part of them.

The uterus is the organ most frequently affected, and as the uterine muscular tissue is continued into the pelvic connective tissue in all directions, such tumors are met with in the pelvis apparently unattached to any organ, as well as growing from the ovary, Fallopian tube, round ligament, and ovarian ligament. A few have been observed in the urethra and bladder. Negroes are particularly subject to them.

2. **Myoma of the Vulva.** Myomata and fibromyomata are occasionally developed from the subcutaneous connective tissue of the vulva, where they may grow to considerable size, become pendulous and cause ulceration of the skin over them. They may also originate in the perineum, the labia minora and the region about the meatus urinarius. Some tumors undergo cystic degeneration, and this change gives rise to the fibro-cystic variety (cysto-fibroma).

They are quite firm in consistence, but often give a sensation of fluctuation or elasticity to the examining finger that suggests a cyst. When not developed in the cutaneous connective tissue the skin can be moved over them.

They should be removed as soon as discovered. The hemorrage is as a rule but slight.

3. **Fibroma and Myoma of the Vaginal Walls** have been found, but the great majority are **Fibromyomata.** They may remain in the vaginal walls or become pendulous and be extruded at the vulva. In the latter case the capsule becomes ulcerated and sometimes gangrenous. They usually give a semi-elastic sensation to the touch, but if aspirated yield only a few drops of blood. The finger should be introduced into the rectum and a hard catheter or sound into the bladder, in order to exclude the possibility of a rectal or vesical origin.

The *treatment* consists of an incision in the vaginal wall over the most prominent portion, followed by enucleation of the tumor and complete closure of the bed with deep sutures. When pendulous they should be amputated and the artery in the pedicle twisted or ligatured.

CHAPTER II.

MYOMA, FIBROMA, AND FIBROMYOMA OF THE UTERUS. (Uterine Fibroids.)

(*Abdominal Hysterectomy.*)

1. Fibromyomata or fibroid tumors of the uterus consist of a proliferation of the muscular and connective tissue of the uterus. According to their location they are called

polypoid, submucous, interstitial, and intraligamentous. The polypoid tumors begin in or just under the mucous membrane on the surface of the walls from which they project more and more, as they grow, until they become pendulous. The submucous develop near the mucous membrane, and project into the uterine cavity without becoming pendulous (sessile) and without any layer, or only an attenuated layer, of uterine muscular tissue on the mucous side. The interstitial develop within the uterine walls at a distance from the surface, and are surrounded on all sides by uterine muscular tissue. The subserous develop upon or near the external surface under the peritoneum, and either project upon the surface or become pedunculated. The intraligamentous or subperitoneal develop on or near the surface not covered by peritoneum, and project from the uterus under the folds of the broad or sacrouterine ligaments.

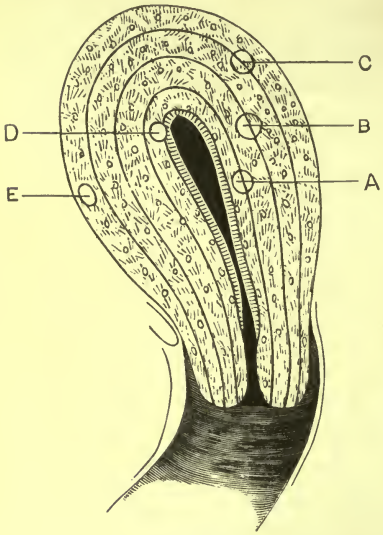

FIG. 210.—ORIGIN OF FIBROID TUMORS.
A. Submucous fibroid that will become polypoid. D. Submucous fibroid that as it develops will project into the uterine cavity. B. Interstitial fibroid that will enlarge the uterine walls in all directions. C. Interstitial fibroid that will project on the surface of the uterus. E. Subserous fibroid likely to become pediculated.

From 90 to 95 per cent. develop in the uterine body. According to Klob 40 per cent. of all women who die after the fiftieth year have uterine fibroids. The estimate is probably too high. They are never found before puberty.

2. **Pathological Anatomy.** These tumors are composed of a varying proportion of connective tissue and hypertrophied muscular fibers irregularly interwoven, and separated from the uterus by a capsule of loose connective tissue. They have their origin in round cells situated about capillary blood-vessels, which become obliterated by the growth of the cells. In rare cases a myoma is fused with the uterine walls without being encapsulated. When composed

FIG. 211.—SUBSEROUS FIBROID, ONE-HALF SIZE. (*Winckel.*)

FIGS. 212 and 213.—INTERSTITIAL FIBROIDS, ONE-HALF SIZE. (*Winckel.*)

FIG. 214.—SUBSEROUS AND SUBMUCOUS FIBROID, ONE-HALF SIZE. (*Winckel.*)

mainly of connective tissue fibers the tumor is called a fibroma; when mainly of muscular tissue it is called a myoma. They are seldom vascular in their substance, but are apt to be surrounded by vascular and hypertrophic uterine walls. The tumor may consist of one mass, or of several distinct masses developed side by side and enclosed in a single capsule, or many tumors with individual capsules may be scattered throughout the uterine walls (multiple fibroids). The density varies in different cases from almost stony hardness to a well-marked flaccidity.

Among the variations from the ordinary may be mentioned the cavernous, which contain numerous small blood spaces from the size

of a capillary to that of a pea. Other variations are edema with corresponding softening of the tumor; cyst formation in their substance (cysto-fibroma) with one or more accumulations of alkaline serous fluid, or of gelatinous fluid of light or dark color; myxomatous degeneration (myxo-fibroma); fatty degeneration; calcareous degeneration; sarcomatous degeneration (fibro-sarcoma), and, rarely, cancerous degeneration. Necrotic and sloughing submucous and polypoid tumors, and abscess formation in the interstitial variety are also observed. Complete fatty or myxomatous degeneration may remove all traces of solid tissue, so that nothing but a sack of thick fluid is found imbedded in the uterine walls (chap. v, par. 6). Sometimes but one tumor is present, and sometimes many are found on the same uterus. Occasional tumors, particularly the cysto-fibromas, attain a large size, one having been removed post-mortem that weighed 195 pounds.

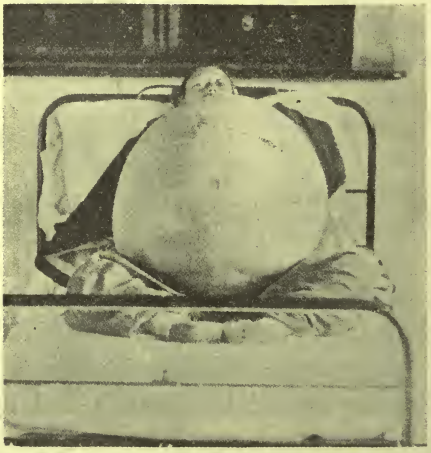

FIG. 215.—LARGE OVARIAN CYSTOMA WEIGHING 182 POUNDS, SUCCESSFULLY REMOVED BY ELIZA REIFSNYDER, SHANGHAI. (*J. Price.*)

Adhesions to the omentum, abdominal walls, or abdominal viscera, exist in nearly all cases of very large tumors, the result of pressure-peritonitis.

Endometritis, usually of the hypertrophic variety, and oophoritis are common complications.

3. **Etiology.** We are still in the dark as to the causes.

From their clinical history and the concurrent pathological conditions of the endometrium and uterine adnexa, it would seem probable that such tumors are the result of long-continued irritation. Whether the lodgment of some microparasite in congested or inflamed tissue in the genital track will be proven to be responsible for their development is a matter of interest. It seems not unlikely.

4. **Symptoms.** In the polypoid and submucous varieties menorrhagia and metrorrhagia are the most notable symptoms; in the interstitial variety menorrhagia is frequent, while in the exclusively subserous these symptoms are often absent. The menopause may be delayed until after the fiftieth year.

Leucorrhea and intermittent watery discharges are common.

Pain is also a frequent symptom. It may be that of endometritis or ovaritis, or it may consist of painful uterine contractions due to the presence of a polypoid tumor, or to stenosis and retention of secretions from pressure of a polypus or submucous growth at or near the internal os; or it may be due to pressure upon the surrounding pelvic tissues by a large interstitial or subserous tumor. The pain from pressure may be in the bladder, rectum or sciatic, or gluteal nerve.

Pressure upon the rectum may cause troublesome constipation and intestinal symptoms. Pressure on the ureter may cause dilatation of the pelvis of the kidney, atrophy of the kidney, albuminuria, etc.

Anemia is often pronounced.

The so-called brown atrophy and fatty degeneration of the heart are apt to be caused by large tumors.

Sterility is the rule, although conception sometimes takes place and goes on to a full term delivery of a living child.

Death may result from exhaustion, uremia, from the heart changes or septicemia.

5. **Course.** Uterine fibroids in the majority of cases run a benign course. They grow slowly and seldom destroy the patient directly from their size. They sometimes stop growing before the menopause and usually diminish in size after it. If polypoid, they may be expelled per vaginam. A small number of interstitial or submucous tumors may attain a great size, but a large number starting almost simultaneously tend by pressure to cut off the blood supply to each other and thus prevent extensive growth. Cystic and malignant degenerations, sloughing and serious pressure upon surrounding organs are somewhat rare. Anemia and general impairment of health are the rule in cases of long standing.

6. **Diagnosis.** *Single interstitial, submucous and polypoid fibroids of moderate size* produce a rounded or ovoid enlargement of the uterus that must be differentiated from pregnancy, retained menses (hematometra), malignant disease and subinvolution. The fibroid uterus is harder than the *pregnant uterus* of equal size, does not present the positive signs of pregnancy, and the cervix, although sometimes slightly dilated, is not softened and deepened in color as during pregnancy. The menses are on time or ahead of time instead of being absent. A large polypoid tumor often dilates the cervix and presents just within the relaxed external os, where it can be reached by the finger.

When the *uterine discharges are retained*, the uterine walls are tense and elastic, but not hard like the fibroid uterus; and either the internal or external os is impermeable to the sound. The menses have never appeared (atresia), or else there will be signs or symptoms of the disease or condition that has caused the stenosis (pyometra, hydrometra).

When the corpus is affected by *malignant disease* (excepting fibro-sarcoma), the offensive discharges are characteristic, and the flowing usually commences gradually as an occasional slight metrorrhagia, instead of as a simple menorrhagia. The sound or curette will bring out some of the malignant tissue. It occurs most frequently at or after the menopause, while fibroid almost always originate before the time.

In *subinvolution* there is generally some cervical as well as corporeal enlargement. The corpus is flatter, not being increased as much in thickness as when the fibroids are present.

7. *Interstitial multiple fibroids* enlarge the uterus more or less irregularly. The sound usually enters farther than normal, and instead of passing into the center of the mass goes in front, behind, or to one side, as determined by a simultaneous rectal or abdominal palpation. The uterine cavity is apt to be irregular in shape, making the passage of the sound difficult or impossible. The fibroid is usually perceptibly harder than ordinary uterine tissue. When the tumor or tumors are near the outer surfaces of the uterus, the hard projections are still more apparent, and can be reached better in difficult cases by having an assistant draw down the uterus by vulsella hooked into the cervix. If the uterus has been involved in an exudate, it may be difficult to determine whether a given projection is a *fibroid*, the *adherent appendages*, or a *small adherent ovarian tumor*. When it is a fibroid the uterus is more movable and less tender, and the walls of the mass and the uterus do not ordinarily form as acute an angle as in the two latter conditions. The history of the case and the discovery of the induration at a distance from the uterus aid in the diagnosis when the condition is of inflammatory origin.

A *pedunculated tumor* is apt to be mistaken for an ovarian tumor unless the pedicle can be palpated. The presence of other subserous fibroids argue in favor of its uterine origin. (See Diagnosis of Ovarian Tumors, chap. VI, par. 11 and 12.)

8. *Retrouterine hematocele and hematoma* of the broad ligament may sometimes be differentiated by mapping out the normal sized uterus in front or to one side of the mass by means of bimanual palpation and the uterine sound. It is often pushed up behind the pubes, where it can be easily grasped bimanually and moved independently of the mass. If it were a fibroid, the uterus could not be moved without moving the tumor with it.

9. When the *tumor is large* it usually displaces the cervix. An intrauterine polypus or a tumor in the anterior wall causes the cervix to sink back toward the coccyx, as in pregnancy, but as the growth becomes too large for the pelvis it draws the cervix upward. A large uterine tumor, unless it projects laterally, may be felt directly over the pubes, leaving both iliac regions free, while an ovarian tumor, although it may be felt over the pubes, also fills one of the iliac regions. An ovarian tumor in the broad ligament does not cause as much enlargement of the uterus as a fibroid, and usually joins it at a more acute angle. Parovarian and broad ligament cysts are softer than fibroids.

10. A *cervical fibroid* is easily recognized by the crescent shape of the external os, and the flattening of the opposite lip. From cancer of the cervix it is known by the normal or merely eroded condition of the overlying mucous membrane, a certain degree of elasticity, and by its tenacity of structure as demonstrated by hooking a tenaculum into its substance.

11. **Prognosis.** Fibroids, although of slow growth,

would, if not interfered with, result fatally in not a few instances. The fibro-cystic and occasionally other varieties may become large enough to put life in danger from their size. Hemorrhage may be a dangerous symptom unless relieved by treatment. The possibility of malignant degeneration and gangrene must be kept in mind. Development in the pelvic connective tissue (subperitoneally) and pelvic peritoneal adhesions or exudates render the prognosis more unfavorable and call for early operative interference.

12. **Treatment.** The treatment may be divided into the palliative and radical. Since the condition, unless neglected, is seldom attended by a fatal result the palliative treatment is often all that is required. A symptomatic cure is frequently effected thereby.

The palliative treatment consists of (1) the cure of the endometritis, (2) the diminution of the blood supply, and (3) the artificial induction of the menopause.

13. The *endometritis* may be treated by repeated curettage, dilatation of the cervix, and if necessary intrauterine applications as recommended in the chapter on Endometritis, or by Electricity.

Curettage, particularly if repeated, usually diminishes the hemorrhage and may be all that is necessary in slow growing tumors, particularly those in patients over forty years old, in whom the menopause may be supposed to arrest their growth.

14. *Electricity* may be made to relieve the endometritis and the vascularity of the submucous tissue, and thus diminish hemorrhage and to a certain extent relieve the vascularity about the tumor. It is well to commence with 50 milliampères three times weekly and work up gradually to 100 for small, and even higher for large, tumors. In hemorrhagic cases the positive pole is used in the uterus, as it coagulates and hardens the tissues ; for those cases with-

out hemorrhage the negative pole is used at least a part of the time. The applications should last from three to five minutes. The intrauterine electrode is made to touch every portion of the endometrium. This, however, usually requires several sittings, a portion only being treated each time. After the menses become normal or somewhat scanty a few more treatments four or five days apart may be made before the patient is discharged.

It is not to be expected that the tumors will diminish very much in size, but the hemorrhage and pain should be relieved, while upon a return of the bleeding the applications may again be made as before. If, however, tumors have in the meantime increased in size, other treatment should receive consideration.

Acute or subacute pelvic inflammation and pus in the pelvis are contraindications to the use of electricity.

Some pain may follow the first few applications, and the hemorrhage may be increased until the entire endometrium has been cauterized, after which decided improvement is to be expected.

The method of using the battery must be studied in special treatises (F. H. Martin, Massey, Apostoli). The principle consists in using a small gold or platinum plated sound insulated to within an inch or about three centimeters of the point, for the purpose of concentrating the current in the uterus, and a large flat external electrode to diffuse it on the surface, and prevent surface irritation.

Extreme antiseptic precautions must be observed in the vaginal manipulations.

In skilled aseptic hands intrauterine electrolysis is attended with but little danger. Electropuncture is, however, too dangerous for ordinary use.

I have not referred to any other therapeutic action of the electricity except that directly upon the endometrium and indirectly upon the uterine congestion, as no other has yet been proven.

15. *Diminution of the blood supply* has been accomplished by the use of ergot, splitting the cervix, and ligature of the uterine and ovarian arteries.

A reliable fluid extract of ergot may be given in half teaspoonful doses three times daily for many months without bad effects, and usually with a decided diminution in the hemorrhage and some decrease in the size of the tumors, particularly the interstitial ones. If the stomach becomes sickened by it, a teaspoonful diluted in three or four ounces

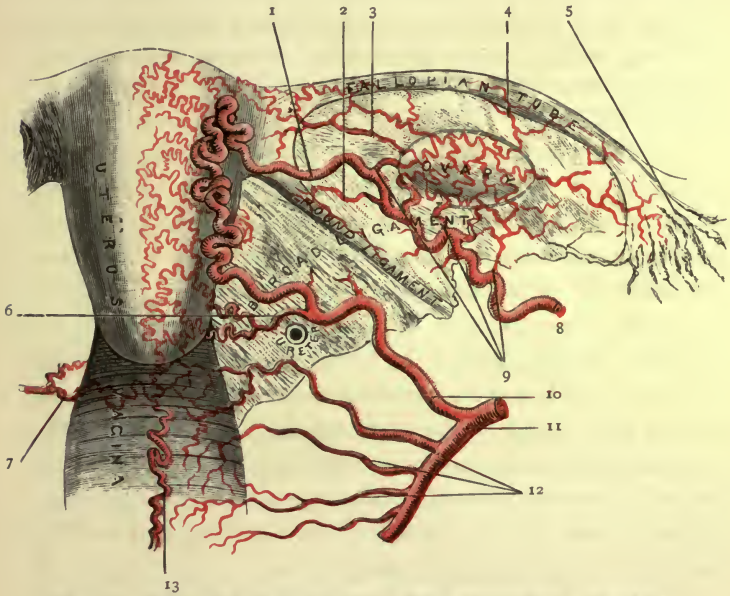

FIG. 216.—SCHEME OF THE OVARIAN AND UTERINE AND VAGINAL ARTERIES. (*From Morris' Anatomy.*)

1. Uterine branch. 2. Branch to round ligament. 3. Branches to isthmus. 4. Branch to ampulla. 5. Fimbriated extremity of Fallopian tube. 6. Cervical branch. 7. Coronal artery. 8. Ovarian artery. 9. Ovarian branches. 10. Uterine artery. 11. Internal iliac artery. 12. Vaginal arteries. 13. Azygos artery of vagina.

(100 c.c.) of water may be given twice daily per rectum; or two grains (0.13 gm.) of ergotin in capsule may be given three times daily by the stomach. It is seldom necessary to give it hypodermically.

Ergot by inducing uterine contractions tends strongly to

diminish the vascularity and vitality of the tumors, and thus to reduce them in size. It sometimes causes expulsion of the submucous and polypoid varieties, with or without gangrene. (W. H. Byford.) (See radical treatment, par. 20.)

The fluid extract of hydrastis Canadensis has been known to diminish the uterine hemorrhage, but does not have any appreciable effect in diminishing the size of the tumors.

Good effects have been noticed from splitting the cervix on either side high enough to sever the branches of the uterine arteries that enter its upper portion. The procedure has fallen into disuse, as it is not as reliable as other remedies.

16. The uterine arteries may be tied through vaginal incisions. (F. H. Martin, Dorsett, Gottschalk.) An incision is made on either side of the cervix, the connective tissue pushed away from the cervix by the finger or a knife handle, until the uterine artery can be felt pulsating. It is then tied with strong catgut or fine, well-sterilized silk, and severed. Martin ligates the broad ligaments for some distance up, and has even included the ovarian artery on one side in a few cases. The parts are then disinfected with a 1–2000 solution of corrosive mercuric chlorid, and the vaginal incision closed. The good effects are often, although not always, immediate and striking. In skilled hands the operation is not dangerous.

F. Byron Robinson has opened the abdomen and ligatured both broad ligaments beside the uterus down as far as the uterine arteries, even including one.

These measures are most useful when the uterus is still of moderate size, yet is vascular and bleeds excessively.

17. The artificial induction of the menopause consists in removing the ovaries. This must usually be done by means of an abdominal incision the same as described for the treatment of incurable disease of the uterine adnexa.

(Part 6, chap. XI, par. 12.) It is indicated for moderate sized tumors that bleed freely in spite of other treatment, and whose removal would involve additional danger. It is well at the same time to ligate the broad ligament as near the uterus as possible for some distance farther down (Robinson), in order to diminish the blood supply and hasten senile changes. The remedy is usually efficacious in cases of tumors smaller than a fetal head, although the good effects do not always immediately follow it. The hemorrhages either gradually or suddenly cease, and the tumors diminish in size. The mortality in selected cases is somewhat less than in removal of the uterus.

When the uterus is much enlarged the abdominal incision should be made in the median line over the upper portion of the mass, and must often be larger than that of ordinary oophorectomy. Sometimes the uterus must be drawn through the incision before the adnexa can be reached.

Development of the tumor in the broad ligament, pyosalpinx or abscess of the ovary may make the operation more difficult and dangerous than removal of the entire uterus.

18. The *radical treatment* consists in the removal of the tumor or tumors, or of that part of the uterus that contains the tumors, or of the whole uterus.

Cervical fibroids are not amenable to palliative treatment and should be removed. When they are small and hang from the cervical canal they may be twisted off. If the tumor and pedicle are large the capsule is incised all around a short distance from the mucous membrane and, after the tumor is twisted or cut off, is sewed over the base. Interstitial cervical fibroids should have their capsule incised and be enucleated. The tissues are then trimmed and the raw surfaces coapted by deep sutures. When this cannot be done, the bed of the tumor and the vagina should be packed tightly with strips of iodoform gauze, or of gauze squeezed

out of the solution of ferric subsulphate (Monsel's solution), for the lacerated cervix has a tendency to bleed. If the cul-de-sac of Douglas is opened, the peritoneum and connective tissue should be sutured with catgut.

When the tumor fills the vagina to the extent that the pedicle cannot be reached, it may be reduced by cutting it in pieces (morcellement).

19. *Intrauterine polypi* smaller than a child's head should be removed in the same way as the cervical. The cervix must, however, be dilated before the pedicle can be reached. The patient is anesthetized, the cervix dilated as wide as possible by steel dilators, or by rubber bags (either covered by or containing a silk bag), and then, if necessary, be incised on both sides to the vaginal junction. The tumor is grasped by vulsella, and if too large to be brought down is cut by strong scissors in half, or in many pieces, until the remnant is so small that the pedicle can be reached and cut. The hemorrhage is seldom significant. The cervical incisions are united by sutures.

20. *Sessile submucous fibroids* smaller than a cocoanut should be removed as soon as they are diagnosed. The capsule is incised and the tumor enucleated with the fingers, scissors being used only for the purpose of cutting long shreds of tissue. When, however, it is too large to be enucleated through the dilated cervix it may be made smaller by morcellement and the remnant be enucleated. The capsule should be sewed up over the bed of the tumor if possible (Senn), but if such is impossible the capsule must be cut off close to the uterine walls, leaving no remnant that would be liable to slough. The uterus should be packed with iodoform gauze for twenty-four hours, and half a teaspoonful of fluid extract of ergot be given every three hours to prevent hemorrhage.

As it is difficult to mechanically dilate the cervix sufficiently, I have often succeeded in securing considerable preliminary dilatation by giving from a half to one teaspoonful of fluid extract of ergot four times daily until uterine contractions were produced, and the polypus was forced into the cervix, or partly through it. The sessile tumors are forced down in the same way. The contraction of the uterine walls diminishes the size of the uterine attachment and often renders them more or less polypoid and hence easily removed. (W. H. Byford.) I have twice seen intrauterine electrolysis induce contractions with a similar effect. Dilatation of the cervix by tents is not advisable, except in hospital practice, on account of the dangers of sepsis.

Polypoid and submucous tumors much larger than a fetal head at term should in nearly all cases be removed by abdominal section.

In cases in which the tumor is interstitial and the uterine cavity large, Vulliet dilates the cavity with long, conical sponge tents, the base of one being at the fundus, that of the other at the external os. After their removal the cavity is irrigated and packed with sterilized cotton. At the end of two days this is removed, and the mucous membrane over the tumor is incised, guided by the finger, and the uterus irrigated with an antiseptic solution and packed with iodoform gauze. The next day ergot is given and electricity used to cause the growth to become polypoid or expel it altogether. As this takes some days, vaginal and intrauterine irrigations should be used two or three times daily. (Cumston.) *

21. *Subserous pedunculated tumors* do not always grow to a large size, and require removal only when they produce pressure symptoms or are observed to be growing at a rate that would lead us to expect future trouble. The abdomen must be opened and the pedicle, if small, ligated with strong silk. When the pedicle is large its capsule may be incised a short distance from the uterus, its fibrous tissue enucleated, and the capsule sewed over the base firmly enough to check all oozing. In some cases it is easier to cut the pedicle wedge shaped with the thin edge extending to or into the uterine wall, and sew up the flaps that are left. Catgut sutures in buried rows, and a superficial row of fine silk sutures, may

* Annals of Gynecology and Pediatry, Jan., 1895.

be used. A subserous tumor without a pedicle may be enucleated and its bed sewed up with buried rows of catgut and a superficial row of fine silk. A temporary elastic ligature should, when practicable, be placed around the uterus and broad ligaments below large tumors that are to be enucleated to prevent bleeding. (A. Martin.)

22. *Interstitial fibroids*, if single, can be enucleated the same as the subperitoneal by first placing an elastic ligature around the uterus below them and then incising their capsule in a longitudinal direction. It is seldom necessary to remove such tumors until they are larger than a fetal head, but if they are growing rapidly they should not be allowed to become much larger. Uncontrollable hemorrhage may call for their removal earlier.

Quite a large mortality has so far attended the enucleation of large tumors. E. C. Dudley recommends stitching the bed into the abdominal incision, when favorably located, and its treatment as an open wound. The bed may sometimes be sewed up with buried sutures and rendered extraperitoneal by stitching the parietal peritoneum to the uterus with catgut on either side of the uterine incision. The abdominal incision is then united as usual over them, the external sutures grasping the edges of the uterine incision. Senn (Transactions Chicago Gyn. Soc., Dec., 1894) anchors the uterus with pins, and packs the wound with gauze. On the third day after all oozing has ceased the wound is closed with sutures. A. Martin thinks that there is no advantage gained by ventrofixation in such cases.

23. *Large submucous fibro-myomas* are to be removed for the same indications and in the same manner as the interstitial growths (par. 22). When too large to be removed per vaginam they may be enucleated by celiotomy. The mucous membrane, after the enucleation, is incised (if not already torn) and the bleeding bed tamponed with strips of iodoform gauze which extend into the vagina. The incised uterine wall is then united firmly over the

packing with catgut sutures, and the inverted peritoneal edges over them. (Senn.) The gauze is removed in five days. When, however, the whole bed can be accurately sewed up, such is, of course, preferable. (A. Martin.)

24. *Multiple fibroids* and *large single tumors* that cannot be enucleated must be removed either by complete or partial hysterectomy. When the symptoms are serious and resist treatment, or when the growth of the tumors is rapid, they should not be allowed to remain to attain a large size, or through their symptoms to undermine the patient's health to a great extent.

When the uterus and tumors are no larger than a fetal head at term they are best removed by vaginal hysterectomy. (Leopold.) See hysterectomy for cancer of the cervix (part 8, chap. III, par. 20). In such cases it is sometimes necessary to bisect the uterus longitudinally (P. Miller), or to cut it away in sections after having ligated or clamped the vessels supplying each section. (Pean.) The bloodless method may be used for small uteri (part 5, chap. V, par. 19).

25. When the *uterus* is much *larger than a fetal head* at term the abdomen should be opened by a median line incision extending from just below or above the umbilicus down to within an inch or less of the symphysis pubis. The tumor is delivered and the broad ligaments tied in sections from the infundibulo-pelvic ligament to the edge of the uterus below the tumors, or the ovarian and uterine arteries are ligatured separately. The uterus is then amputated above the ligatures, either just below the tumor or at the internal os.

The stump thus formed may have a wedge-shaped piece cut out of it and then be sewed up with catgut and dropped into the peritoneal cavity (intraperitoneal method). Or it

may be treated extraperitoneally by stitching or clamping it into the abdominal wound, or turning into the vagina through an opening made into the anterior vaginal fornix (vaginal fixation), or by stitching the peritoneum from the bladder over the stumps and, if there be much oozing, draining into the vagina through an opening made in front of the cervix.

Another method is to ligate the broad ligaments down to the vaginal junction, amputate the uterus and then remove the entire cervix (total hysterectomy). The cervix may be removed from below as in vaginal hysterectomy, or from above by cutting around it, ligating such vessels as may bleed freely and sewing up the vaginal edges by a running catgut suture.

It cannot yet be decided just what procedures will finally prove the best. There are almost as many modifications of these methods as there are prominent operators, and considerable comparison of notes is yet to be made.

26. The treatment of fibro-myoma of the uterus *during pregnancy* is still under discussion. A small tumor of the anterior lip interferes but little with labor (J. F. Fry's case). A tumor of the posterior wall of the cervix should be enucleated as soon as discovered unless the pregnancy has advanced to the latter half. In advanced pregnancy the hemorrhage attending its removal (Mayo Robson's case) is apt to be serious, while if it is removed during the first stage of labor the prolonged pressure of the fetal head and attenuation of the cervical tissues tend to prevent excessive hemorrhage. Polypi should be removed by ligature and cutting of the pedicle, but not by torsion lest the softened cervix be torn.

Tumors above the internal os seldom interfere seriously with labor, and unless they extend down into the cervix, or

are pelvis-bound, do not call for a sacrifice of the fetus, since from 70 to 80 per cent. may be expected to go on to term, and labor at term is but little more dangerous than induced abortion (Hofmeier). The rapid growth of fibroids during pregnancy is generally counterbalanced by a corresponding diminution in size during uterine involution.

The operation upon tumors at term that prevent the birth of the child should include removal of the uterus, as the Cesarean section is seldom suitable for a fibroid uterus.

If there seems to be a possibility of the child being born alive per vias naturales, it is usually better to allow labor to proceed, for the tumor is nearly always drawn up out of the way.

CHAPTER III.

FIBRO-MYOMA OF THE FALLOPIAN TUBE, FIBROMA OF THE OVARY.

1. **Fibro-myoma of the Fallopian Tube.** But few cases of fibro-myoma of the Fallopian tube have been observed. Simpson met with one case the size of a fetal head. Schwarz reported one originating at the junction of the tube with the uterus. Spaeth reported a fibroid enlargement of the middle and distal end of the tube.

The *diagnosis* cannot be made with certainty, except by the aid of an exploratory incision (part I, chap. IV, par. 7 and 8).

The *treatment* consists in removal by peritoneal section.

2. **Fibroma of the Ovary** occurs in the form of a fibroid proliferation of the stroma, and is not encapsulated as are uterine fibroids. It is usually unilateral and small in size,

although occasionally large, and may involve a portion or all of the ovary. It is hard and nodular, and composed of fibrillar connective tissue, and sometimes contains unstriped muscular fibers (fibro-myoma). The follicles are generally obliterated, but small cyst-cavities (geodes) of uncertain origin form in some tumors. A small quantity of ascitic fluid is usually found in the pelvic peritoneal cavity.

Such tumors may also develop from the corpus luteum. (Rokitansky.) The denticulated folds of that body are recognized in their structure by the microscope.

Ovarian fibroma undergoes various forms of degeneration, sarcomatous (fibro-sarcoma), calcareous, osseous and cystic (fibro-cystoma).

The pedicle is usually short and fleshy, and not connected with the Fallopian tube. The tumor may develop between the folds of the mesovarium and become sessile. It is of a slow growth and is usually found in young women.

3. The *diagnosis* from a pediculated uterine fibroid is difficult unless both ovaries, or the place of origin of the uterine pedicle can be palpated. Malignant solid ovarian tumors grow faster, and are apt to be bilateral, and in the later stages are accompanied by ascites, infiltration of the broad ligament and metastatic deposits.

The *prognosis* is unfavorable on account of continued growth, and the danger of sarcomatous degeneration.

Treatment. They should be removed by abdominal section as soon as discovered.

CHAPTER IV.

FIBRO-MYOMA OF THE ROUND LIGAMENT, OVARIAN LIGAMENT AND BROAD LIGAMENT.

1. **Fibro-myomata of the Round Ligament** are very rare. A myxo-fibroma (Duplay), fibro-myo-sarcoma (Sanger), and myoma lymphangiectodes (Leopold), have been observed. Not more than three or four cases are on record of such tumors situated within the peritoneal cavity, the usual location being at the external inguinal ring and labium majus.

The *diagnosis* of those situated within the peritoneal cavity is usually impossible. Those developed externally are differentiated from the various forms of hernia by their irreducibility, the absence of succussion upon coughing, absence of tenderness, and the slight increase in size and tenderness during the menstrual period. Glandular enlargement is recognized by its nodular characteristics, and sometimes by the affection of neighboring glands. Congenital hernia of the ovary is known by the shape of the ovary, the fact that it has always been there, by dysmenorrhea, and by the characteristic pain evoked upon firm pressure. The tumor of the round ligament lies often more or less loose in or above the labium majus, as if pediculated from the external abdominal ring. Rapid growth indicates malignancy.

The *treatment* consists in incision, ligature of the round ligament, extirpation of the tumor and suture of the wound.

2. A few cases of **Fibro-myoma** growing from the **Ovarian Ligament** have been reported, one by Doran weighing sixteen pounds (8 kilos). Their diagnosis and treatment are the same as those of fibroma of the ovary.

3. **Fibro-myomata of the Broad Ligament** are occasionally observed. Whether they develop from the tissue of the ligament primarily, or are developed from migratory fibroid bodies from the uterus, or both, has not been definitely determined.

The *diagnosis* is the same as that of cystic tumors of the broad ligament, excepting the fact that they are solid. When they are large their place of origin cannot be discovered.

The *treatment* consists in enucleation. The resulting cavity of the broad ligament is treated the same as that left after enucleation of a broad ligament cyst (chap. VII, par. 4).

CHAPTER V.

CYSTIC TUMORS OF THE VULVA, VAGINA AND UTERUS.

1. **Cysts of the Glands of the Labia Majora** and vestibule occasionally attain the size of a walnut. They should be removed, and the raw surfaces sutured. Small ones may be incised and cauterized.

Cysts of the vulvo-vaginal glands (Fig. 143) are in nearly all cases retention-cysts, and have been considered elsewhere (part 6, chap. II, par. 1).

Encysted blood in the labium majus has been described in part 4, chap. I, par. 2.

Cysts of the cervix due to inflammation of the follicles have been described in part 6, chap. VII, par. 4.

2. **Hydrocele of the Labium Majus** is an accumulation of fluid in a prolongation of the canal of Nuck. The peritoneal sac extends along the round ligament into the labium majus, forming, when filled with peritoneal fluid, a labial

tumor. The upper part of the labium is enlarged, as in hernia, but the fullness within the border of the ring is absent. If the neck of the sac is not closed, the mass is reducible, and varies with abdominal pressure like a hernia. If not reducible, the tumor is elastic, translucent, is not tender, and yields a clear serum on aspiration.

The *treatment* when the peritoneal cavity is shut off consists in aspiration, and, if the fluid reaccumulates, in a second aspiration and the injection of the tincture of iodin. If this fails, the sac may be dissected out of the labium, and the parts sutured with silkworm gut.

When the sac communicates with the peritoneal cavity, a truss may be worn, or the neck obliterated by cutting down on the external inguinal ring, severing the sac and uniting the pillars of the ring over the stump.

Small congenital cysts of the hymen, the result of an imperfect union of the two layers (Doederlein), leaving between them a cystic space, have been observed. Bastelberger believes such cysts to be due to a folding in of epithelial cells of the surface, or crypt formation, and separation of the enclosed cells from the superficial layer.

3. **Cysts of the Vagina** are accumulations of a clear, viscid, pale yellow fluid in the vaginal walls, forming tumors from the size of a pea to that of a large egg, which, however, may grow larger if not interfered with. They are single in about 80 per cent. of cases (Poupinel).

The cyst wall is composed of fibrillar connective tissue which often contains muscular fibers. It is lined in some cases with cylindrical epithelium that is occasionally ciliated; in others it is lined with the pavement variety. Papillæ on the internal surface, and adenoid degeneration of the cyst wall (Kleinwachter) have been observed.

The origin is supposed to be the remains of the canals of Gärtner (Veit). Remains of an ununited duct of Muller

(part 2, chap. IV, par. 3 and 4) may give rise to them in some cases; in others, glandular development or crypt formation in the vaginal wall.

4. The *diagnosis* is made by the discovery of a rounded elastic tumor on the vaginal wall, which yields a clear fluid on aspiration. It is differentiated from a cystocele or rectocele by introducing a finger into the rectum or a catheter into the bladder, and palpating against a finger in the vagina.

5. The *treatment* consists in making an incision over the tumor and enucleating the entire cyst wall if possible. The bed should then be sewed up with buried catgut, or deep silkworm-gut, sutures. When situated high up in the vagina, and of large size, we should remove a large portion of the cyst wall, cauterize the remainder with carbolic acid, and pack it with iodoform gauze.

6. **Cystic Tumors of the Uterine Wall** have been observed up to the size of an adult head. They usually contain a viscid or thick fluid of a grayish, chocolate or yellowish color. In some cases its resemblance to pus has caused the tumor to be mistaken for an abscess of the uterine wall. Their discovery in connection with fibroids makes it probable that some of them are degenerated fibroids, even when no fibroid masses are found. It is also probable that such tumors may result from cyst formation in a canal of Gärtner. (Fischel, Klein.) One or more retention cysts may grow into the uterine wall as the result of endometritis. These are usually small.

Treatment. If the tumor can be reached through the dilated cervix, a portion of the cyst-wall and endometrium may be excised at the most dependent part. If discovered after the peritoneum has been opened, it may be incised and evacuated from the peritoneal side, the uterine cavity

opened, the cavity packed with gauze extending into the uterus and vagina, and the incision on the peritoneal side be closed with deep and superficial sutures. A third of the gauze is removed each succeeding day. In some cases the cyst has been opened from the peritoneal side and treated extraperitoneally by stitching the cut edges into the abdominal wound and packing with gauze.

CHAPTER VI.

CYSTIC TUMORS OF THE OVARY.

1. There are three varieties of cystic tumors of the ovary: simple cysts, proliferating cysts, and dermoid cysts. The proliferating cysts may be of a glandular, papillary or mixed character.

2. **Pathological Anatomy.** *Simple cysts* (Hydrops follicularis). Leaving out of consideration the small follicular cysts which have been described in connection with oophoritis, we meet with cysts developed from the follicles, which are from the size of an orange up to that of a man's head. They are thin-walled and of a white or pearly blue color, fluctuate upon a slight touch, and are usually monocystic. Similar cysts may develop from the corpus luteum after the blood has been absorbed. (Rokitanski.) Occasionally a number of small cysts are formed together, assuming somewhat the appearance of a bunch of grapes.

The fluid is a clear serum containing paralbumen and a few granules; that of corpus luteum cyst is apt to be a little thicker, and colored yellow or brownish by the remains

of the bloody contents. It is not coagulated by heat. The smaller cysts often contain an ovum.

The wall is composed of two layers of dense connective tissue united by loose connective tissue in which the blood-vessels are contained. Both the outside and the inside of the cyst are covered by cylindrical epithelium. The inner wall of the corpus luteum cysts is usually of a rusty or orange hue and folded as in corpora lutea, and can be easily separated from the deeper layer. Microscopically the inner coat is composed of a dense network of capillary loops, enclosing large, variously pigmented globular cells, intermixed with leucocytes. (Fraenkel.)

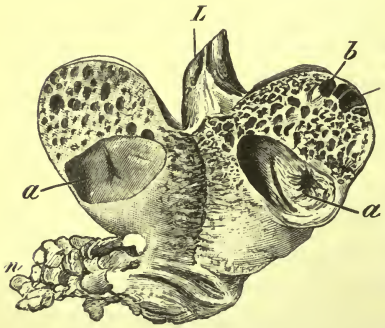

FIG. 217.—BEGINNING PROLIFERATING CYSTOMA OF OVARY (Natural Size). *a*. Large cyst. *b*. Small cyst. *n*. Fimbriæ. *L*. Ovarian ligament. (*Winckel.*)

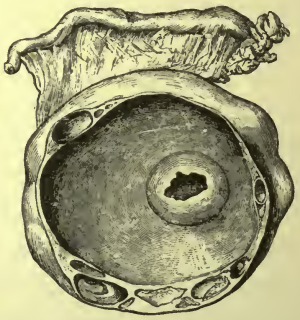

FIG. 218.—OVARIAN CYST WITH SECONDARY DEVELOPMENT OF SMALLER CYSTS IN ITS WALLS One small cyst is seen which has ruptured into the larger cyst. (*Doran.*)

3. The *proliferating cysts* are developed from Pflüger's ducts (Waldeyer) or from the epithelial covering of the ovary (Malassez and de Sinety). The variations in the relative development of the epithelial and connective tissue elements give rise to the different forms which the tumors assume, in the glandular cystoma the epithelial development, in the papillary cystoma the connective tissue devel-

opment predominating. Recent observations by Williams and others would make it seem probable that these tumors may also be developed from the follicles.

4. The *simple proliferating or myxoid cystic tumor* (cystoma ovari proliferum glandulare) consists of one or more cysts with firm whitish or pearly gray walls which are divided into the same layers as the simple cysts (par. 2). Ordinarily there is one large cyst with several smaller ones developed on its inner wall which, after attaining considerable size, are apt to rupture into the larger one with final obliteration of their septa. The remains of these septa are nearly always found on the large cyst wall. Sometimes several of the secondary cysts attain a large size. In rare instances the tumor may be a mass of trabeculated connective tissue whose interstices are filled with fluid. In other cases the secondary cysts push the external cyst wall before them and form a mass of small pedunculated cysts.

The tumor may grow almost indefinitely until it destroys the patient, and has been known to weigh over 100 pounds, from 40 to 50 kilograms.

Its shape is usually round or ovoid, and may present slight elevations on its surface corresponding to small cysts in its wall, or it may be furrowed by the partitions between larger cysts. Large tumors press upon the surrounding tissues and contract adhesions with the uterus, abdominal walls, omentum and abdominal viscera.

The fluid in the cyst is usually somewhat viscid, but may be as thin as serum or almost solid. It may be yellow, gray, green or brown, and the color as well as consistency may vary in different cysts of the same tumor. It is alkaline, is coagulated by alcohol and by heat, and does not readily decompose. It contains albuminous and mucous

(pseudo-mucin) substance, the latter being a secretion of the epithelial cells. (Pfannenstiel.)

It contains epithelial cells, blood corpuscles, spindle-shaped cells, granular bodies, granular matter, fat globules, crystals of cholesterin and many other formed elements.

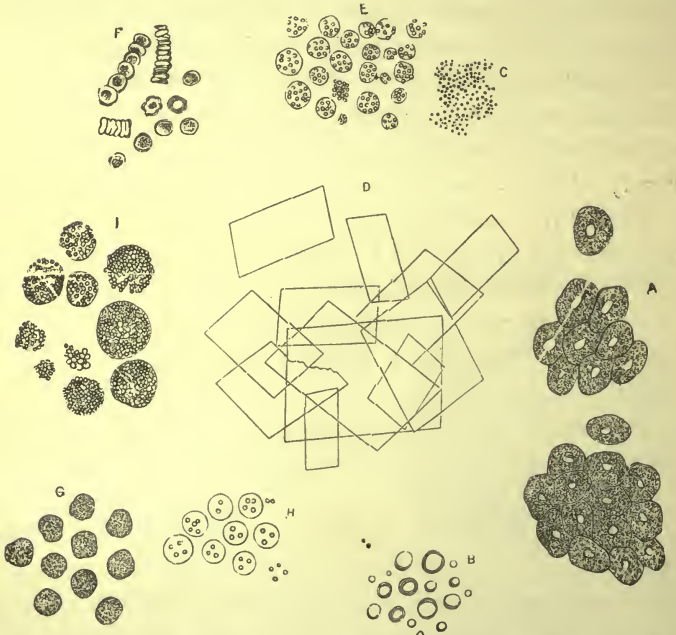

FIG. 219.—MICROSCOPIC EXAMINATION OF FLUID FROM OVARIAN TUMORS. (*Atlee.*)
A. Epithelial cells of various forms. B. Oil globules. C. Fine granular matter. D. Crystals of cholesterin. E. Granular cell. F. Blood corpuscles. G, H. Pus cells. I. Inflammatory globules of Gluge.

Drysdale's corpuscle is a globular or polyhedral body containing several shiny granules. Garrigues, after careful investigation, considers them to be epithelial cells in a state of fatty degeneration.

The inner surface of the cyst wall often has a rough,

corrugated appearance, like the interior of the stomach. (Klebs.) The epithelium is mainly cylindrical, but goblet-shaped and flat cells are also found. The growth of cells is exuberant and atypical, and results in the formation of closed pouches in the corrugated cyst lining. These become filled with cells and later with fluid, and thus form the secondary pouches which, when they persist, develop similar secondary pouches on their inner surfaces. This cell formation sometimes invades the cyst wall and the tumor assumes the characteristics of carcinoma. In such cases ascites, adhesions, and metastasis take place.

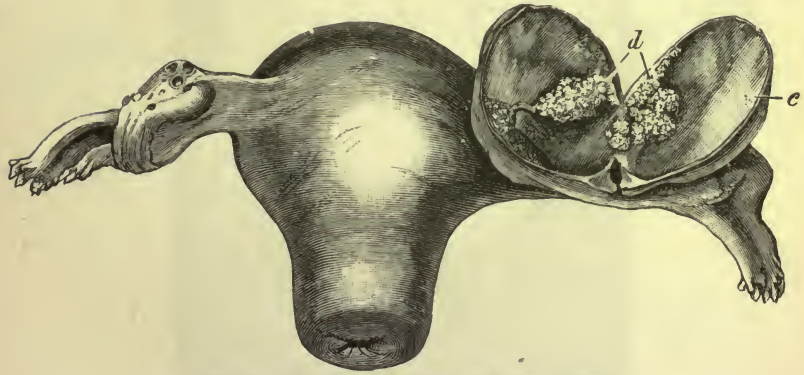

FIG. 220.—PAPILLARY CYSTOMA OF RIGHT OVARY.
c. Cystoma. *d*. Its inner surface, showing papillary proliferation.

When in consequence of rupture of a cyst wall thick, colloid fluid escapes into the peritoneal cavity, a mild form of peritonitis may ensue, and delicate layers of connective tissue and vessels, with endothelium proliferation, are projected into and around the unabsorbed mass. Thus a new formation resembling the original tumor may be produced. (Pseudomyxoma, Werth; gelatinous disease of the peritoneum, Péan.)

5. The *papillary ovarian tumors* (cystoma ovarii proliferum papillare) are characterized by the growth of villi or

papillæ on the inner, sometimes on the outer, surface of the cyst wall, forming masses from the size of a pea to that of the head of a small cauliflower, which they resemble.

These tumors are usually smaller and of slower development, are often bilateral, and contain fewer secondary growths than the glandular variety. They are supposed to

FIG. 221.—SECTION THROUGH PAPILLOMATOUS OVARIAN CYSTOMA, SHOWING ITS INTERNAL SURFACE. (*Freeborn.*)
A. Main cyst. B. Small cyst. C. Remains of Ovary.

originate near the hilum and are apt to develop subperitoneally between the layers of the broad ligament. Kossmann's theory that they develop from the ciliated epithelium that extends from the tube seems plausible. He claims that they result from accessory tubes, or diverticula from the tube, extending into the mesosalpinx.*

* *Monatsschrift für Geburtsh. und Gynakologie*, February, 1895.

The epithelium lining the cyst is ciliated. The papillary growths may fill the cyst, or unite and form new compartments within it, or may penetrate the cyst wall and invade the surrounding tissues. The irritation of the peritoneum caused by the inflamed or perforated cyst wall gives rise to ascites, which may fill the abdomen and protect the viscera from the numerous adhesions that would otherwise form. When the cyst wall ruptures before perforation, the surrounding peritoneum becomes infected, usually with fatal results.

FIG. 222.—DERMOID CYST OF RIGHT OVARY CONTAINING HAIR AND SEBACEOUS MATTER. (*Winckel.*)

a. Sebaceous cyst. *b*. Blonde hair filling main cyst. *c*. Left ovary.

About 10 per cent. of all ovarian tumors are papillomatous.

6. *Mixed proliferating cystomas* are those in which both the glandular cyst formation and papillary growth occur.

7. *Dermoid cysts* are supposed to be the result of invagination of cells of the epiblast, hypoblast, or in rare cases of displaced cells of the mesoblast in the ovary during its embryonic development. A. W. Johnstone believes them to be the result of a faulty development of the ovum.

These are the most common ovarian tumors before puberty, but constitute less than 4 per cent. after puberty.

They are met with from the size of a hazelnut to that of an adult head. They are generally unilateral, although sometimes bilateral or even multiple, two or more being found in the same ovary. They grow slowly, may develop between the layers of the broad ligament, and are apt to contract adhesions and become infected. They usually consist of one main cyst, but secondary cysts may develop from the sebaceous and sudorific glands.

The fluid contains an abundance of fat globules, cholesterin, and some urea, oxalic acid, leucin, tyrosin, nerve and brain substance, and unstriated muscular fibers. Blonde hair, in irregular masses or in long coils, is usually found, sometimes teeth (from 1 to 300) and bones, and occasionally a breast, a heart, or an eye.

A portion or all of the inner layer of the cyst wall may be similar to that of the skin, even to the subcutaneous fat, and may be smooth or partly covered by warty prominences. Next to the subcutaneous fat comes the external layer, which is usually thin, but together with the inner layer often constitutes quite a thick wall. Mucous membrane lines a portion or all of some cysts.

The glandular proliferating cystoma is occasionally complicated by dermoid formation in one or more of the cysts.

8. Cystic ovarian tumors may be developed intra-peritoneally or extra-perineally (subperitoneally).

In the former variety the tumor extends into the free abdominal cavity, drawing upon the broad ligament and forming a pedicle composed of the ovarian ligament, Fallopian tube, and upper portion of the broad ligament. The pedicle may be long or short, thick or thin, without much reference to the size of the tumor. In about 10 per cent.

of cases it is twisted, occasionally to such an extent as to cause venous hemorrhage into one or more cysts, and inflammation and adhesions of the cyst wall, or even gangrene. Complete separation of the tumor may result from such torsion, the tumor being nourished by the adhesions. If early adhesions have formed about a tumor it may become impacted in the pelvis. Those which develop extraperitoneally (usually the papillary variety) extend downward between the layers of the broad ligaments, separating them and coming in direct contact with the walls of the pelvic viscera. As the tumor grows it strips up the peritoneum from the colon or rectum, and lifts up the uterus with it as it ascends out of the pelvic cavity. Or it may become impacted in the pelvis and exert dangerous pressure upon the pelvic viscera. These tumors as a rule originate in the portion of the ovary near the hilum (the paraoophoron). See Fig. 227.

9. **Etiology.** The causes of ovarian cystic tumor are unknown. They occur in the fetus and in all stages of life. Whether some form of micro-parasite will be found to account for some or all of them is at present impossible to determine.

10. **Signs and Symptoms.** When the tumor is small it seldom gives rise to characteristic symptoms. Slight menorrhagia or dysmenorrhea, and other symptoms of chronic oophoritis, may however be noticed. Bilateral growths usually cause sterility.

When developed in the broad ligament, pain in the iliac region, menorrhagia, dysmenorrhea, constipation, dysuria, and pain along the gluteal and sciatic nerves may be caused by it.

Dermoid tumors, on account of their long sojourn in the pelvis, are apt, sooner or later, to contract adhesions and

exhibit the above-mentioned symptoms, together with those of peritonitis and metritis.

Usually the first manifestation of tumors that develop intra-peritoneally is abdominal enlargement. The abdomen increases in size, the flanks become striated as in pregnancy, and feelings of weight and pressure in the abdomen with impaired digestion, and emaciation which is particularly noticeable about the face (Facies ovariana), are noticeable. The veins of the abdomen and legs are often visibly enlarged, and sometimes the limbs become edematous. The lower ribs are pressed outward and the diaphragm upward, causing dyspnea and palpitation of the heart.

Death results from exhaustion due to the interference of the tumor with the functions of the abdominal and thoracic viscera. Peritonitis, pleurisy, pneumonia, heart failure, chronic uremia, and other evidences of imperfect function and impaired circulation, one or another, may assume prominence, giving the final coup-de-grace.

The progress may be rapid, but it is usually slow, extending over several years. They seldom stop growing.

Occasional mild attacks of abdominal pain are due to inflammation following more or less twisting of the pedicle, and are apt to be accompanied by the formation of adhesions.

A sudden attack of pain and soreness in the tumor, with rapid increase in its size, nausea, and feeble pulse, followed by a rise of temperature to 101° or 102° F., denotes a twisting of the pedicle and hemorrhage into the interior, due to the obstruction of the twisted veins. The tumor assumes a darker hue, and the fluid is either chocolate colored or clotted. Old clots are yellowish.

Sudden peritoneal pains with a rise of temperature to from 100° or 101° F., and disappearance or diminution in the size of the tumor, denote rupture and escape of the contents into the peritoneal cavity. If the fluid be thin and unirritating the symptoms are slight, and are usually followed by a copious secretion of urine.

Persistent peritoneal pains, with a fluctuating temperature and

other signs of sepsis, are due to infection of the tumor, or of fluid that may have escaped from a ruptured tumor.

Scanty urine and symptoms of renal disease sometimes result from pressure on the ureters.

Icterus, meteorism, and even obstruction of the bowels may be caused by the pressure upon the abdominal viscera.

11. **Diagnosis of Small Tumors.** When developed intra-peritoneally a small tumor is frequently overlooked. If, however, it is in the recto-uterine cul-de-sac it is easily felt as a rounded elastic body that can be pushed up out of reach. When not in the cul-de-sac it can, unless the pedicle be very short, only be palpated bimanually. In order to differentiate from hydrosalpinx the ovarian ligament which connects with the uterus must be caught between the fingers of both hands. It feels like a somewhat rigid, hard cord. In case of hydrosalpinx the flabby, ill-defined isthmus of the tube, which sometimes has a small secondary cyst in it, connects it with the uterine horn. Hydrosalpinx is softer, sometimes tender, and often convoluted or tapering toward the uterine horn. In rare instances the ovary of the same side can be palpated. If adherent in the cul-de-sac the ovarian tumor gives rise to increasing distress, while the hydrosalpinx usually gives no more, or even less, trouble than previously. A rectal examination, with or without the aid of anesthesia, may be necessary to make these distinctions evident.

A pedunculated fibroid is known by the attachment of its pedicle to the fundus or anterior or posterior uterine wall, and sometimes by the presence of other fibroid nodules in or on the uterine walls. It feels more solid. Both ovaries can be palpated.

A dermoid with adhesions is round and somewhat soft or fluctuating above, with usually a hard area in the pelvis,

corresponding to the dermoid or bony structure and the adhesions. If large, it elevates the uterus and pushes it forward and to the opposite side. It is sometimes situated in front of the uterus, pushing the fundus backward. It is ordinarily found in *young people*, and is apt to cause more suffering than other ovarian cysts of the same size.

Pyosalpinx and hematosalpinx are usually hard all over instead of in places, and are situated behind and beside the congested or inflamed uterus. They are nearly always bilateral, and if unilateral push the fundus more to one side.

An abscess of the ovary feels hard, is lateral, lies between the pelvic wall and uterus, and is usually connected with previous pelvic peritonitis and present metritis.

Hematocele and extrauterine pregnancy and cystic peritonitis have their peculiar symptoms and clinical history. (See part 10, chap. 11.)

A retroflexed gravid uterus is less elastic, more tender, moves with, and can usually be traced to, the cervix. The cervix is soft, patulous, and purple in color, and the symptoms of pregnancy may be present. Bimanually, the absence of the fundus from its normal position can be demonstrated.

12. **The Diagnosis of Intra-ligamentous Cystomata** must be made from cyst of the broad ligament, uterine fibroid, hematoma, pelvic inflammation, and tuberculous salpingitis.

When so situated, the cystoma is low down beside the uterus and cannot be displaced. When it fills the side of the pelvis it lies against the uterus, but is separated at the lower edge by a distinct sulcus, and is elastic and somewhat sensitive. As it grows it displaces the uterus upward and toward the opposite side anteriorly. When papillo-

matous, its base may be hard, and free ascitic fluid may be found in the peritoneal cavity.

A *cyst of the broad ligament* is soft, fluctuant, and less sensitive. Sometimes the ovary of the same side can be discovered by the bimanual rectal examination.

A *uterine fibroid* projecting into the broad ligament is solid, has a venous murmur over the enlarged vessels, and moves more distinctly with slight movements of the uterus. The uterine cavity is usually enlarged, the uterus often nodular, and the ovary can sometimes be discovered. As a rule it grows slower than the ovarian cystoma.

Hematoma and *cellulitis* have characteristic histories, and usually extend under the uterine ligaments toward the pelvic wall as palpated per rectum. Hematoma and large cellular abscesses push the uterus more forward toward the pubes or opposite inguinal ring and reach farther down between the vagina and rectum.

Complication with *pelvic inflammation* may make a diagnosis impossible. The mass becomes progressively larger and the symptoms steadily worse, without the long intervals of improvement that accompany salpingitis.

Tuberculous salpingitis is liable to be mistaken for papilloma. The presence of tuberculosis elsewhere, early emaciation, subnormal temperature in the morning, and the closer resemblance to inflammatory disease argue in favor of the former.

Sometimes we must content ourselves with deciding that we have to deal with a condition that requires a peritoneal section. At other times we cannot be sure of even this, but we can decide that the mass contains fluid and can be safely aspirated. In such cases we may introduce an aspirating needle through the vaginal wall at a place where no vessel can be felt and draw off sufficient fluid for examination. Serous fluid, blood, pus, or fat are easily recognized. The ovarian fluid is known by its viscidity, solidification by heat, its resist-

ance to decomposition for many days, the discovery of some of the formed elements by the microscope, and by the coagulation tests.

13. **The Diagnosis of Large Cystomata.** When the cystoma has become large enough to distend the abdomen, it must be differentiated from general *ascites*. As the patient lies on the back, the abdomen is prominent at or near the umbilicus if the former, but somewhat flattened if the latter be present.

If the tumor be multilocular, the fluctuation is felt over limited areas, but does not extend without interruption from one side of the abdomen to the other. In ascites the fluctuation is general and more distinct.

Percussion gives a dull note over the umbilicus in the former, and resonance in the flanks, while the opposite is true in the latter. When the patient is turned on the side, the place of resonance changes to the uppermost side in ascites, and the umbilical region yields a dull percussion note, while the places of resonance and dullness do not change in case of cystoma. When, however, the intestines are adherent so that they cannot move upon each other, we may have umbilical dullness in ascites. In such cases, by pressing well into the abdominal walls, we will in some instances be able to elicit a deep-seated resonance.

If there be a circumscribed accumulation of peritoneal fluid, due to localized peritonitis (tuberculous, malignant, etc.), the resonance will not change its place, but it will either be less regular in outline, or the dullness will in places shade off into resonance instead of ending abruptly as it does at the edge of tumors, and the fluctuation will be the more easily detected on account of the absence of a firm cyst wall.

Large parovarian or broad ligament cysts present the same dull areas as cystomas, but they fluctuate as readily

as ascitic fluid, and flatten slightly as the patient lies on the back, on account of having thin walls. They feel soft and fluctuant to the vaginal touch, while cystomas feel more resistant and sometimes hard.

14. Having ascertained that there is a cystic tumor, its place of origin must be determined. By moving the tumor in different directions, at the same time that we press our fingers deeply into the abdomen under the border of the ribs, in the flanks, and iliac and pubic regions, we can often discover in which of these regions it is attached. If it seems connected with the pelvis, we seek by a bimanual vaginal examination to ascertain its relation to the uterus. If it moves with the uterus it is a soft or a cystic uterine fibroid, or a cyst adherent to the uterus. If the uterine cavity be much deeper than normal and the mass is felt by the hand on the abdomen to pass down behind the pubes, probably one of the first. If it does not move with the uterus, it may be ovarian, or be connected with the uterus by a small pedicle. We should then grasp the cervix with vulsella (Hegar), draw down the uterus, and hand the forceps to an assistant, while we examine the upper portion of the uterus with our fingers in the vagina and rectum. We will recognize the ovary on one side, while on the other we will detect the tense ovarian ligament running upward toward the tumor, particularly if the tumor is pressed up toward the ribs by a hand on the abdomen. (B. S. Schultze.) This will often perceptibly drag up the uterus. If the tumor is a pediculated uterine fibroid, both ovaries will be discovered, or perhaps the pedicle itself.

Hydronephrosis, when large, simulates ovarian cystoma in that it is cystic and lies over the pelvic brim. If on the right side the ascending colon lies over it on the inner side, while if it is on the left side the descending colon lies directly upon it. Percussion may

reveal an area of resonance over it, auscultation may discover intestinal gurgling, or the bowel, if empty, may be rolled between the fingers until it contracts and is distinctly palpable. (Spencer Wells.) These signs are rendered more apparent by pumping air into the rectum.

Abnormalities of the urine are more apt to be present in hydronephrosis. Sometimes kidney tissue may be palpated on its posterior surface.

An attempt should be made to palpate both ovaries.

When complicated by pregnancy there are two tumors to be felt, with the signs of pregnancy and the distress naturally caused by the fullness of the abdomen.

15. When the *whole abdomen is distended* by a fluctuating tumor, its origin is difficult to determine. Fibro-cystic tumors are often mistaken for ovarian. The high position and immobility of the cervix, elongated uterine cavity, absence of the normal contour or decided enlargement of the uterus as palpated per vaginam, the vascular murmurs over the sides of the tumor, and the history of uterine hemorrhages would lead us to decide in favor of fibro-cystic uterine tumors, although not all of these characteristics are, as a rule, manifest in the same case. Large fatty tumors from the kidney-region can sometimes only be differentiated by a discovery of the ovaries by rectal palpation. In fact, in all doubtful cases of abdominal tumors an attempt at rectal palpation of the ovaries, under an anesthetic, should be attempted, unless the propriety of interference or non-interference be already determined.

The diagnosis of adhesions is often difficult. Tumors much larger than a pregnant uterus at term may be supposed to have contracted adhesions. Attacks of pain and localized tenderness in some part of the tumor are apt to accompany their formation. When a large tumor is not adherent to the abdominal parietes, the umbilicus can often be made to glide over it quite easily.

16. *Exploratory puncture* is only advisable in connection

with preparations for an abdominal section. *Tapping* is sometimes practised to relieve dangerous pressure, preparatory to an operation under more favorable circumstances, and enables us to examine the fluid, as well as palpate the tumor and its pedicle more satisfactorily. (See part 1, chap. IV, par. 5.)

17. *Exploratory incision*, either in the linea alba or recto-uterine *cul-de-sac*, is of great value in the diagnosis of tumors of moderate size and of doubtful nature. It is well to be prepared to go on with the operation should such be found desirable. It is a less dangerous procedure in the hands of a competent gynecological surgeon than exploratory puncture or tapping. (See part 1, chap. IV, par. 7 and 8.)

18. **Prognosis.** Ovarian tumors almost invariably destroy life sooner or later. Complications usually increase with the age and size of the growth, and malignant degeneration is so common, that they should be removed as soon as discovered.

19. **Treatment.** There is no curative treatment for ovarian tumors but extirpation.

20. *Tapping.* When the condition of the patient is such that an operation would not be endured, attempts should be made to improve the condition. Tapping of very large cysts may be necessary to relieve the pressure upon the heart and digestive organs, and enable the patient to recuperate before the radical operation is undertaken. Those who, on account of other diseases, cannot be expected to live long, may be made more comfortable by it. In the later months of pregnancy tapping may sometimes be resorted to in the interests of the child, since it is less liable to be followed by an abortion than ovariotomy. (See part 1, chap. IV, par. 6.)

Tapping may cause hemorrhage by the wounding of a vessel in the peritoneum or cyst wall, or may be followed by an escape of some of the fluid into the peritoneal cavity, or by an infection of the tumor, and hence should be reserved for exceptional cases with urgent indications, and in connection with ample preparations for an immediate ovariotomy in case an accident should happen. The fluid usually reaccumulates faster after each evacuation.

21. **Ovariotomy.** *Contraindications* to the performance of ovariotomy may be said scarcely to exist, although there may be conditions of the system that require temporary preparatory treatment for the purpose of putting the patient in a better condition (par. 19).

It is possible however for the time for a successful operation to have passed, as in case of malignant tumors infecting the surrounding structures, and in extreme exhaustion, or organic disease of the abdominal or thoracic viscera, due to prolonged pressure.

Diseased conditions, such as peritonitis, sepsis, obstruction of the bowels, connected changes in or about the tumor, usually call for an immediate operation.

22. *Abdominal Ovariotomy.* The steps of the operation are as follows, the patient lying on the back :—

Incision in the linea alba, about three inches long, halfway between the umbilicus and pubes. (Part I, chap. IV, par. 7.) Separation of parietal adhesions about the incision, if such be present. Palpation of the tumor to ascertain, if possible, its relation to the uterus, bladder, and broad ligaments. Tapping the cyst with a trocar to which a rubber tube is attached to carry the fluid into a pail under the table, while an assistant keeps the abdominal walls firmly pressed against the tumor. Grasping of tumor on either side of, or just above and below, the trocar as soon as it is sufficiently flaccid. Pulling the cyst wall out on the abdominal walls, and complete delivery

as soon as empty, unless other cysts or adhesions prevent. Enlarging of cyst opening so as to tap other cysts through it. Tying off of omental adhesions. Separation, or dissecting off and leaving, such portions of the external covering

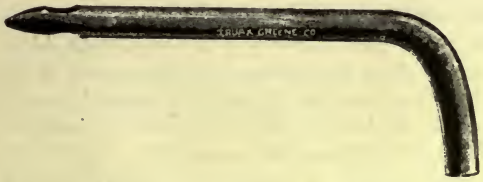

FIG. 223.—TAIT'S OVARIOTOMY TROCAR.

of tumor as are involved in intestinal or other visceral adhesions. After delivery of cyst, tying of pedicle in two parts, or, if too short, clamping of pedicle with forceps, and cutting off tumor about 2 cm., or two-thirds of an inch, from the ligature or forceps. Tying of pedicle beneath forceps,

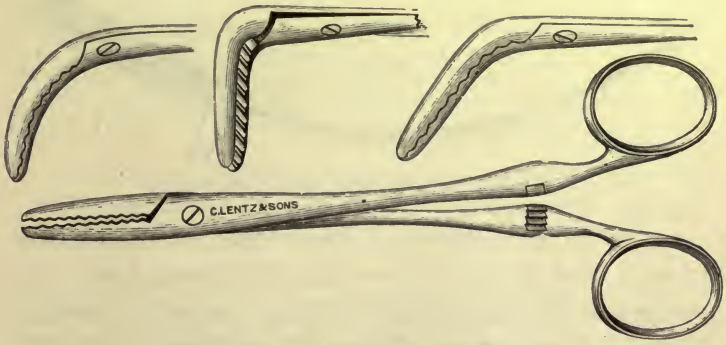

FIG. 224.—SPENCER WELLS' PEDICLE FORCEPS.

the forceps being taken off as the ligature is tightened. Examination of remaining ovary, and its removal if similarly diseased, or if the patient has passed the menopause. Sponging of blood or fluid from the peritoneal cavity. Closure of

wound by superficial and deep silkworm-gut sutures. (See part 1, chap. IV, par. 2.) For operation upon tumors developed in the broad ligament see chap. VII, par. 4.

The pedicle should be tied with No. 16 twisted silk (loose twist) or No. 10 braided. It should be transfixed through the ovarian ligament, the infundibulo-pelvic edge of the broad ligament, and through its center with a double thread, and be tied on each side. Then after the tumor is cut off, or the clamp is removed, one of the threads is again tied tightly around the stump at the same place as before. The ligatures are cut off about a centimeter, one-third inch, or a little less, from the knots, and the pedicle is dropped.

Oozing surfaces may be treated by sponge pressure, temporary forcipressure, suture with fine catgut, or exceptionally with mild thermo-cautery or the application of a little diluted Monsel's solution. Steam from a small elongated spout of a kettle is a powerful hemostatic when applied to oozing surfaces. (Snegirjoff.)

If considerable oozing persists, it may be necessary to put a drainage tube about the size of the little finger in the lower angle of the wound extending down in the recto-uterine cul-de-sac (part 1, chap. IV, par. 2).

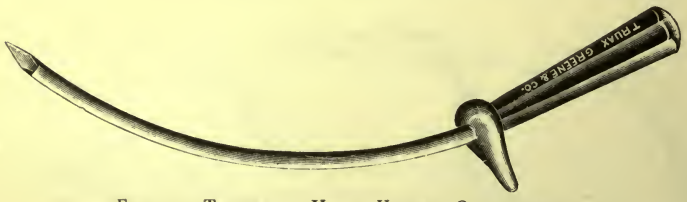

FIG. 225.—TROCAR FOR USE IN VAGINAL OVARIOTOMY.

23. *Vaginal Ovariotomy.* Tumors that are smaller than an adult head and quite movable, or adherent low in the cul-de-sac of Douglas, may be removed through an incision in the posterior vaginal fornix. The operation is the same as vaginal oophorectomy (part 6, chap. XI, par. 11), except that the tumor, which is held down by pressure over the pubes, and also caught by a hook from below, is evacuated by a trocar and, after being douched off, is pulled into the vagina.

As soon as the vaginal incision is made, the operator examines the tumor and pedicle with two fingers passed into the abdominal cavity, and searches for contraindications and complications. Adhesions high up, and a thick indurated and friable pedicle may be considered as such.

24. *Complications.* When a tumor cannot be completely removed without too much risk to the patient, its lining membrane should be enucleated, and the outer walls cut off at a level with the abdominal walls and stitched into the abdominal wound. (See treatment of tumors of broad ligament, chap. VII, par. 4.) If the lining cannot be peeled out, the cysts should all be broken open, the tumor be cut off as directed above, the interior swabbed out with the tincture of iodin, the edges stitched into the wound and the cavity packed loosely with strips of iodoform gauze. After about four days the gauze should be removed, and a large double rubber drainage tube be inserted. The cavity should then be washed out once or twice daily with a two per cent. solution of carbolic acid until it is reduced in size, when occasional injections of the tincture of iodin will hasten its obliteration. The surface must be kept well dilated.

If after several months a fistula remain, an incision near and parallel to the old one on the side of the tumor should be made into the peritoneal cavity, and the fistulous track be dissected out.

25. *Vaginal Hysterectomy for Ovarian Tumors.* When tumors smaller than an adult head are adherent low down in the pelvis, or are developed subperitoneally, and present such signs and symptoms as lead one to infer that they could not be enucleated from above without enormous risk to life, the uterus may be removed per vaginam. Through the space thus gained the tumor should be enucleated as completely as possible, and the bottom of the pelvis be packed

with iodoform gauze, in order to drain the raw surfaces and spaces in which shreds of the lining membrane are adherent. The gauze is drawn out little by little, about one-fifth or one-sixth each day.

CHAPTER VII.

CYSTS OF THE BROAD LIGAMENT. (SUBPERITONEAL CYSTS.)

PAROVARIAN CYSTS.

1. *The parovarium* is the remains of the excretory ducts of the Wolffian body (mesonephros) and corresponds to the vasa efferentia and epididymis of the male. It consists of from five to fifteen narrow tubules in the mesosalpinx near the ovary, and may be divided into three parts: (1) Gärtner's duct, running transversely toward the uterus, (2) vertical tubules, extending from the Gärtner's duct to the paraoophoron, and (3) Kobelt's tubes, which are attached to Gärtner's ducts, but are free at the distal end. They are lined with cylindrical epithelium.

2. Cysts may arise in the tubules of the parovarium, constituting parovarian cysts, or in the substance of the broad ligament, constituting broad ligament cysts. These cysts may grow to considerable size, and should be distinguished from the hyatid of Morgagni and small pediculated cysts the size of a pea arising from Kobelt's tubes.

They develop between the layers of the broad ligament, and may draw up the ligament until it constitutes a pedicle, but usually they develop downward between the anterior or posterior layer of the broad ligament, lifting up the peritoneum and attaching themselves loosely to the surround-

ing tissues, particularly the tube and ovary, which are stretched over them.

The cyst wall is delicate and consists of the peritoneal covering, a loose layer of connective tissue containing a few blood-vessels, some unstriped muscular fiber, occasionally glands, and a layer of cylindrical epithelium on the interior, which is sometimes ciliated, but does not communicate with the glands.

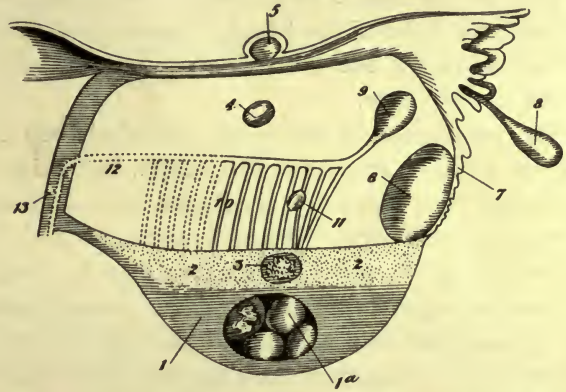

FIG. 226.—DIAGRAM OF THE STRUCTURES IN AND ADJACENT TO THE BROAD LIGAMENT. (*Doran.*)

1. Framework of the parenchyma of the ovary, seat of a simple or glandular multilocular cyst, 1 *a*. 2. Tissue of hilum, with, 3, papillomatous cyst. 4. Broad ligament cyst. 5. A similar cyst above tube, but not connected with it. 6. A similar cyst developed close to 7, ovarian fimbriæ of tube. 8. The hydatid of Morgagni. 9. Cyst developed from the horizontal tube of parovarium; cysts 4, 5, 6 and 8 are always lined internally with a single layer of epithelium. 10. The parovarium. 11. A small cyst developed from a vertical tube. 12. The duct of Gärtner, often persists in the adult as a fibrous cord. 13. Tract of that duct in the uterine wall.

The fluid is thin and clear, slightly alkaline, and of a specific gravity of about 1010 or less, and yields an albuminous precipitate with nitric acid and alcohol, but not by heat alone.

These cysts originate after puberty, grow slowly, and give rise to but little inconvenience until they have attained to a large size.

3. *Diagnosis.* They push the uterus to the opposite side, are softer than hematomas or cystomas of the ovary, fluctuate more readily, are unilocular and not tender. (See diagnosis of cystic ovarian tumor, chap. VI, par. 12 and 13.)

4. The *treatment* is the same as that of cystic ovarian tumors, except that very small ones need not be disturbed, or, if favorably located, may be aspirated through the vaginal walls. When, upon opening the abdomen and emptying them, no pedicle is found, they should be cut off a little above the level of the broad ligament, and the lining membrane be peeled out of the broad ligament. In small cysts this is quite easy.

If, after enucleation of the tumor, the whole bed can be drawn up, it can be sewed up with catgut, care being taken not to include the ureter; or the broad fold thus secured may be ligatured in parts. When, however, the bed extends to the bottom of the pelvis, a puncture may be made into the posterior vaginal fornix, a rubber drainage-tube be passed through into the vagina, and the edges of the broad ligament be sewed together so as to shut off the abdominal cavity. The tube should be taken out in forty-eight hours. If there is much bleeding, the bottom of the cavity can be packed with strips of gauze, and the lower end be brought out into the vagina. About one-fourth of it should be pulled out each day.

When such treatment is not practicable, the cut edges of the broad ligament may be puckered together and sewed into the lower portion of the abdominal wound, and the cavity be packed with a continuous strip of iodoform gauze two inches wide. A gauze dressing is put over the wound and renewed every four or six hours. About one-quarter of the gauze packing is pulled out each successive day, and the blood that is thus forced to the surface at each dressing

is pressed out and absorbed with cotton pledgets. In this way the blood is drained away, and the wound contracts and heals without suppuration. When the last of the gauze is removed, a fresh strip is introduced barely through the abdominal walls and is left for twelve hours. After that, fresh gauze dressings are applied over the wound and between the ununited cutaneous edges every eight hours until the slight space that remains has cicatrized. At each change of gauze the parts may be washed off with strong alcohol or a 1–2000 solution of corrosive mercuric chlorid.

CHAPTER VIII.

LIPOMA.

1. Fatty tumors are found in the subcutaneous connective tissue of the vulva or in that of the pelvis. Subperitoneal tumors, originating in the fat of the omentum and region of the kidney, occasionally attain a large size and descend to the pelvis.

2. **Lipomata of the Vulva** may grow to considerable dimensions and become pendulous or pediculated. They present the characteristics of fatty tumors elsewhere.

They give a slight sensation of fluctuation, as is the case of vulvar fibroids, but are a little softer (more doughy). The overlying skin is intimately connected with the tumor, and presents depressions corresponding to those between the lobules of the tumor.

The *treatment* consists in removing them by the knife and sewing together the edges of the skin over the raw surface.

3. **Lipomata of the Broad Ligament** of small size

have been observed a number of times, particularly under the Fallopian tube. Exceptionally they may grow large enough to be recognized by examination as a tumor.

Subperitoneal Lipomata of the kidney region or omentum that descend to the pelvis cannot usually be differentiated from tumors of other kinds. They are more doughy and semi-fluctuant than fibroids, and are of slower growth and produce less effect upon the general health than carcinoma or sarcoma arising from the same places.

They should be removed as soon as discovered, since they may grow to a large size, and the operation become a very formidable one.

CHAPTER IX.

VARICOSE VEINS, VASCULAR TUMORS, URETHRAL CARUNCLE.

1. **Varicose Veins** are found in the vulva and broad ligament.

Varicose veins of the vulva cause an enlargement of the vulva, which during the pregnant state may attain the size of a cocoanut. The principal enlargement is outside, although the varices may extend into the vagina. The veins may be seen as dark-blue, irregular-shaped masses, that collapse on pressure, but immediately refill when the pressure is removed. They are seldom sensitive to the touch, but may cause disagreeable burning, aching, and itching sensations in the parts. A feeling of weight or bearing down, and sometimes a frequent or constant desire to urinate are felt.

They are caused by pressure on the pelvic veins by the

pregnant uterus, abdominal tumors, exudates, etc. Straining at stool, laborious occupations, displacements of the pelvic viscera, may cause them, but their effect may only become noticeable in advancing age, or after conditions of extreme emaciation or debility.

Rupture, with the formation of a large hematoma or even with external hemorrhage, occasionally occur.

Astringent lotions, such as saturated solutions of tannin, sugar of lead, or alum, may be applied for temporary relief. A well-adjusted pad, supported by a T-bandage, may be worn with benefit. An abdominal bandage to support the pregnant uterus is sometimes helpful. The patient should lie down a portion of the time, avoid lifting and straining, and keep the bowels well regulated. Ligature of the veins should not ordinarily be attempted, since it is impossible to include the deeper ones.

Rupture with external hemorrhage should be treated by compression until preparations can be made for the introduction of sutures deep enough to include the bleeding vessels.

Rupture with hematoma is described in part 4, chap. 1, par. 2.

2. **Dilatation of the Internal Pelvic Veins** cannot usually be diagnosed except by exclusion. It occurs more often in the left broad ligament, and is preceded by a relaxed condition of the pelvic tissues and a burning or dull aching pain extending upward from the inguinal canal of the affected side. The ovary is apt to be slightly enlarged and hangs rather low in the pelvis.

The treatment consists in holding the uterus well up in the pelvis with an Albert Smith or Thomas retroflexion pessary, and if retroversion exist an Alexander's operation, or hysterorrhaphy. Reefs have been taken in the ligament

(Kelly) when the condition was found during abdominal operations, but the impossibility of including all of the dilated veins, and the danger of wounding the blood-vessels, or of including the ureter, would render the procedure justifiable in extreme cases only.

3. **Small Vascular Spots or Tumors** are sometimes found on the vulva, in the vagina, or in the urethra. They are of but little importance and seldom give rise to trouble. They can be removed by cautery, or by excision and suture.

4. **Urethral Caruncle** is a vascular tumor growing from the mucous membrane of the urethra, at or near the meatus. It is usually single, although sometimes several are found. One occasionally grows just outside of the urethra. They vary in size from a pin-head to a large grape.

They are composed of hyperplastic mucous membrane and an abundance of dilated capillaries. Some contain such an abundance of nerve fibers that they have been called neuromata.

The chief symptoms are dysuria, dyspareunia, and sometimes retention of the urine.

They are bright red in color, round or oval in shape, usually extremely sensitive, and are easily made to bleed. They are either pediculated or sessile, and should not be mistaken for everted folds of urethral mucous membrane accompanying follicular or granular urethritis (part 6, chap. IV, par. 5).

They may be removed by torsion of the pedicle and cautery of the base with nitric acid, or if the base be large by burning them off with the electro-cautery, or a wire heated over a lamp. A 10 per cent. solution of cocain will usually benumb the parts sufficiently for the former procedure.

If the tumor originates high up in the urethra the meatus should be dilated with sounds, a speculum be introduced, and the tumor cauterized, or taken off with a snare.

CHAPTER X.

PAPILLOMA. ELEPHANTIASIS VULVÆ.

1. *Papillary growths* and *vegetations* are found on the vulva, in the vagina, in the Fallopian tube and on the ovary.

2. **Papilloma or Condyloma of the Vulva and Vagina** are simple vegetations or warty growths formed by hypertrophy of the papillæ. They may be isolated or grouped into large masses from a whitish or pale red to a deep wine color. Those on the skin may be hard or soft, and assume the shape of flat masses or raised ridges. Those in the vagina are usually soft and raised or villous in character and deep red, and may extend to the fornices. They are accompanied by a somewhat fetid discharge, which may irritate and excoriate the parts over which it flows.

The *causes* in most cases are irritating discharges due to venereal infection. The tendency to their development is increased by pregnancy.

The *treatment* in mild cases consists in antiseptic vaginal douches and astringent and antiseptic ointments, such as the oxid of zinc ointment, containing five per cent. of carbolic acid. The radical treatment consists in cauterizing them or in cutting them off and cauterizing the base.

3. **Papilloma of the Fallopian Tubes.** Papillary growths have in only a few instances been found in the Fallopian tubes. They may fill the tube, perforate it, and in-

fect the peritoneum. As in superficial papilloma of the ovary, there seems to be some doubt about their benignant nature. Venereal disease has been given as a cause. (Sutton.)

The ordinary vegetations of the tubal mucous membrane resemble papilloma somewhat in appearance, and should not be confounded with them.

The treatment is removal of the tube.

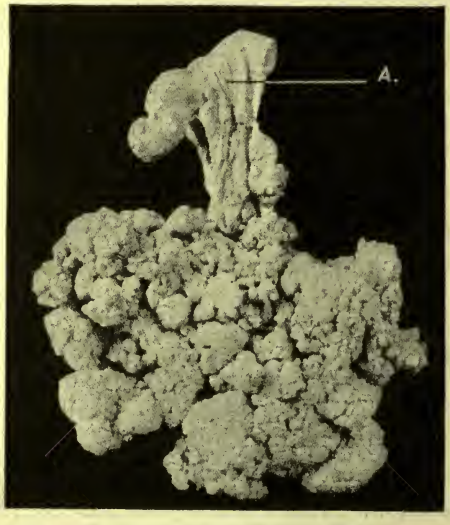

FIG. 227.—PAPILLOMA OF OVARY. (*Freeborn.*)
A. Fallopian tube.

4. **Papilloma of the Ovary.** Papillary growths may develop in ovarian cysts (chap. VI, par. 5) and from the surface of the ovary.

When developed from the *surface* they occur as cauliflower masses growing upon the ovary which infect the peritoneum and also the pelvic connective tissue, and without attaining great size may give rise to an induration of the

pelvis that feels much like that of pyosalpinx to the examining finger. The vegetations may spread over the uterus and appear on the surface of all the surrounding viscera. Some ascites is apt to be present.

They are usually associated with epithelioma, and there is some doubt as to whether they are not always secondary to cancer.

The symptoms, diagnosis and treatment are the same as of carcinoma of the ovary.

FIG. 228.—ELEPHANTIASIS NYMPHARUM. (*Winckel.*)

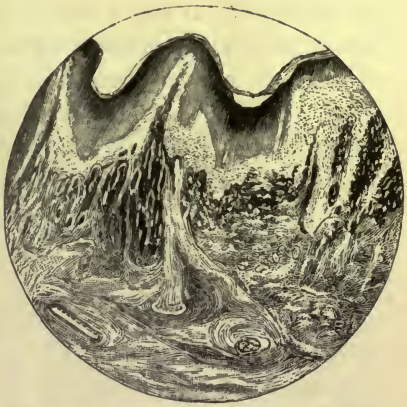

FIG. 229.—MICROSCOPIC SECTION OF FIG. 228. (*Winckel.*)

5. **Elephantiasis Vulvæ** is a rare affection in this climate, being a disease of the tropics. It affects the labia majora, clitoris, and sometimes the labia minora.

It is characterized by a hypertrophy of the skin due to a diseased condition of the lymph vessels. There is dilatation

of the lymph spaces, stagnation in the lymph channels, and sometimes a filling up and obliteration of the lymphatics by proliferation of the endothelium. (Cornil and Ranvier.)

The appearance of the skin may be smooth (Elephantiasis glabra), warty (E. verrucosa), or papillary (E. papillomatosa). The consistence of the tissue may be hard or soft. The hypertrophy may produce an extended thickening of the skin, or may go to the extent of producing large tumorous masses hanging from the genitals and invading the surrounding areas.

Symptoms. There is a sense of dragging or weight about the vulva, but seldom any pain except such as comes from excoriations due to friction. Its development is very slow, often extending over years.

Diagnosis. It can scarcely be mistaken for papillomata, which affects the surface instead of the entire thickness of the skin, nor for fibroma or lipoma, which are under the skin. Lupus is circumscribed and tends to ulcerate, while elephantiasis is diffuse, and its ulcerations or excoriations heal when the irritation is stopped. Carcinoma pursues a rapid course and ulcerates extensively.

PART TEN.

ECTOPIC PREGNANCY, PELVIC HEMATOCELE, AND PELVIC HEMATOMA.

CHAPTER I.

ECTOPIC PREGNANCY.

(*Ectopic Gestation. Tubal Pregnancy. Extra-uterine Pregnancy.*)

1. Under certain conditions the ovum, failing to reach the uterus, may become impregnated on the ovary or in the Fallopian tube, and go on developing outside of the uterine cavity.

According to the circumstances, the pregnancy may be ovarian, abdominal, tubo-ovarian, tubal, and tubo-uterine, also called interstitial. Pregnancy in the broad ligament or subperitoneal connective tissue is a form of the tubal variety.

2. **Pathology.**—By far the most common variety is the tubal, in which the ovum lies entirely within the tube. The epithelium disappears at the site of implantation of the ovum, and an imperfect decidua is formed. The villosities of the chorion attach themselves directly to the tubal walls, which as the ovum develops undergo hypertrophy. But, as the hypertrophy does not keep pace with the growth of the ovum, the tubal walls, about the third or fourth week, begin to stretch and thus become progressively thinner. Between the fourth and eighth week the ovum may, if situated near

the abdominal end, be expelled through it into the perineal cavity, constituting the so-called tubal abortion. If situated at some distance from the ostium abdominale, the ovum will rupture the tubal walls between the third and twelfth weeks, and nearly always escape either into the peritoneal cavity or into the connective tissues of the broad ligament. The rupture is followed by more or less copious hemorrhage, which may form an intra-peritoneal hemato-

FIG. 230.—GRAVID FALLOPIAN TUBE AT THE TENTH WEEK, SHOWING COMPLETE OCCLUSION OF THE OSTIUM.

t. Isthmus of tube. *g*. Gravid portion of tube. *c*. Cavity of chorion, seen through an artificial opening. *o. a*. Ostium abdominale.

cele or subperitoneal hematoma, or destroy the life of the patient. Tubal abortion produces similar hemorrhage, but it is always into the peritoneal cavity. Hemorrhage into the chorion may produce an apoplectic ovum, or mole, that sometimes remains in the tube after hemorrhage through the ruptured tubal walls or patent ostium abdominale has taken place.

When the ovum is developed in that portion of the tube

passing through the uterine wall (tubo-uterine or interstitial), the uterine cornu becomes hypertrophied, and the rupture may not take place until the twentieth week. In such cases the hemorrhage proves rapidly fatal. In other instances it perishes before the time for rupture, and becomes infected from the uterine cavity. Exceptionally, it passes into the uterus and goes on developing as in normal pregnancy.

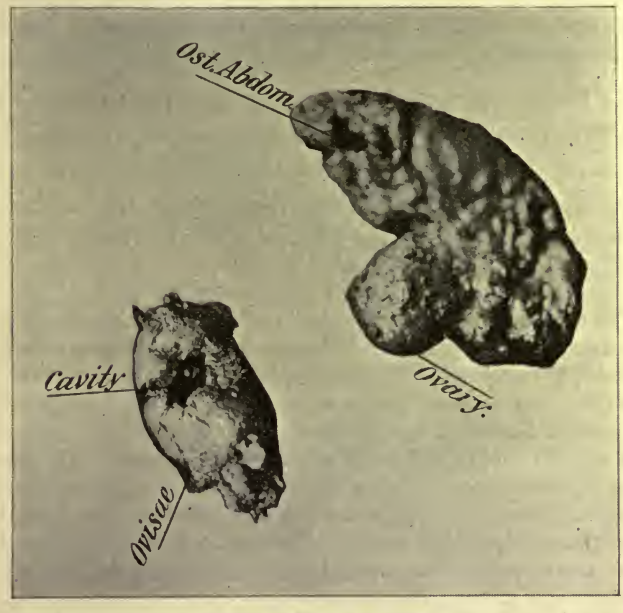

FIG. 231.—APOPLECTIC OVUM, OR TUBAL MOLE, AND TUBE AFTER TUBAL ABORTION AT EIGHT WEEKS.

The tube and the ostium abdominale, through which the ovisac escaped, have contracted.

When developed on the fimbriæ of the tube, or the surface of the ovary, the placenta rapidly covers both the ovary and fimbriæ, and the ovum develops either in a sac formed partly by the tube and the ovary (tubo-ovarian), which ruptures as in the tubal variety, or it loses its placental connec-

tion with the fimbriæ and develops to full term in an adventitious sac of connective tissue in the free abdominal cavity (abdominal); or else it develops between a fold of peritoneum and the ovary. In the latter case the ovarian tissue may become a part of, or nearly all of, the sac; or, on the other hand, the ovarian tissue be all absorbed. As a *rara avis* it is said to develop in the ovary itself (ovarian).

A hemorrhage into the tube during the first few weeks may destroy the ovum and result in a hematosalpinx, which may become infected and transformed into a pyosalpinx.

3. The uterus undergoes evolution similar to that of the first two months of normal pregnancy, and a decidua 3 to 6 mm., or ⅛ to ¼ inch thick, forms, which may be expelled piecemeal or entire from the uterus. The nearer the ovum is to the uterus the greater are the changes in the uterus.

The decidua differs from a normal decidua in that its inner surface shows no evidence of the attachment of the ovum. Its outer surface, however, has chorionic villi, and thus differs from the membrane expelled in cases of membranous dysmenorrhea. The latter is only 2 to 3 mm., or 1-12 to ⅛ inch thick.

Abel asserts that the decidua of extra-uterine pregnancy when expelled does not carry any glandular tissue with it, while the decidua of abortion always contains portions of fetal membrane or of the glandular tissue. Curettage would, of course, always bring glandular tissue, and hence pieces removed by the curette cannot be used for the purpose of making this distinction.

4. After rupture of the tube into the peritoneal cavity, if the patient survive, a hematocele forms. If the membranes do not rupture, the placenta may spread out over the peritoneal surface, and the fetus go to term and perish during an attack of spurious labor.

When rupture of the tube into the broad ligament takes place, a hematoma may form with death of the fetus; or

the rupture may be small and gradually enlarge without destroying the fetus, and the tube become a part of the cavity. (Bland Sutton.) The ovum may in the latter case develop to full term in the broad ligament, or it may rupture through the broad ligament fold into the peritoneal cavity and develop there.

The placenta may spread out from the tube, and be lifted up by the fetus growing in the broad ligament so as to form a thin layer of placental tissue over the sac, or it may develop in the broad ligament as a thick, well-formed placenta under the fetus.

The anterior fold of the broad ligament is, in the later months, lifted up and peeled off the abdominal wall for a short distance. The rectum or cecum, one or the other, is apt to be stripped of its peritoneum to a variable extent, the sac adhering to the denuded intestinal walls.

The fetus is usually poorly developed or deformed, and seldom lives more than a few days even when removed at or near full term.

Twin pregnancy may occur in which one fetus is in the uterus, or in which both are in one tube, or one in each tube. A tubal pregnancy may take place subsequent to one on the opposite side, or intrauterine pregnancy may follow the tubal conception. The author has removed a small lithopedion with a ruptured tube from each side at one operation.

5. After *spurious labor* the fetus perishes and undergoes mummification or septic changes.

A mummified fetus may be merely dried up by absorption of the soft parts, or it may undergo partial transformation into adipocere (a union of a fatty acid with ammonia), or the tissues may be impregnated with lime salts, producing partial calcification.

When the sac is adherent to an intestine, the contents of the sac may become infected and undergo decomposition and suppuration, and ulcerate into the rectum or upper

intestines, vagina, bladder, or through the skin. Infection may also reach the sac by way of the uterus and Fallopian tube.

After rupture of the tube and formation of an hematocele in the earlier months, absorption or suppuration may occur (chap. II). Or chronic pelvic peritonitis with displacements and adhesions of the uterus and appendages, and more or less plastic exudate, or bloody or serous effusion, around the remains of the fetus may persist for years.

6. **Etiology.** The causes of ectopic gestation are such as prevent or retard the passage of the ovum to the uterus, viz.: adhesions of the tube that cause a malposition, sharp bend, or tortuous course, an imperfectly-developed or cork-screw-shaped tube (Fig. 38), destruction of the ciliated epithelium (Tait), or an obstruction within the tube, such as a polypus, torsion, etc. The cause of the rupture or abortion is an attenuation of the tubal walls, particularly at the placental attachment, due to the growth of the fetus or to hemorrhage within the tube after the ostium abdominale has become occluded. The immediate exciting cause is apt to be a fall or blow on the abdomen, or physical exertion of the patient.

Whether a salpingitis, with exfoliation of epithelium, is necessary to prepare the tube for impregnation (Tait), or whether the "genetic influence" that produces decidual changes within the uterus may exceptionally produce similar changes within the tube (J. Clarence Webster) we cannot say.

7. **Symptoms.** The accident occurs more often in patients with a history of salpingitis, or in those who have not borne children for several years.

In many cases some of the symptoms of pregnancy are noticed, such as nausea, changes in the breasts, enlargement

of the uterus, and the characteristic softening and venous discoloration of the cervix.

The menses are usually delayed a week or ten days, then a uterine hemorrhage appears, which is less abundant than the normal menses, followed in a week or two by another bloody flow, and at variable intervals by others. In many instances there is a slight bloody discharge most of the time.

Paroxysms of intense colicky pain across the lower abdomen sometimes precede these hemorrhages. The patient is apt to think that she is having an ordinary abortion.

Occasionally tubal pregnancy will go on until rupture without producing any noticeable symptoms.

8. *Rupture* is usually heralded by an unusually severe attack of pain, and is followed by the symptoms of internal hemorrhage, viz.: shock, a feeble, rapid pulse, nausea, etc. The patient may die in collapse, or may react and, in a few hours or days, have another "sinking spell," and later others; or she may present mild symptoms of peritoneal irritation, and recover with an intra-peritoneal hematocele, or a hematoma of the broad ligament.

Expulsion of the decidua usually but not invariably indicates that rupture or death of the fetus has taken place.

9. The symptoms after rupture, should the fetus survive, are those of pregnancy, and some tenderness and pain in the pelvis and iliac region.

10. **The Physical Signs** before rupture are the changes in the uterus that belong to normal pregnancy, a slight enlargement and tenderness of the Fallopian tube, and some restriction in the mobility of the uterus. The enlarged tube is usually soft.

After rupture into the abdominal cavity there are the

same signs, with increased tenderness behind and beside the cervix, and also slight abdominal tenderness, distention, and tympanites. If the patient survive the attack a retro-uterine hematocele may be felt after a few days by vaginal indagation.

After rupture into the broad ligament the physical signs of hematoma of the broad ligament present themselves (chap. II).

If the fetus continues to grow, whether in the broad ligament or in the free abdominal cavity, the abdomen becomes enlarged by a tumor somewhat laterally situated, and the fetal parts can be distinguished either by abdominal palpation or by a recto-vaginal digital examination. The uterus is usually pressed up behind the pubes.

11. **The Diagnosis** is not always difficult when the physical signs are considered carefully in connection with the symptoms, yet it may be impossible before rupture, on account of a lack of characteristic symptoms. Colicky pains in the lower abdomen and signs of internal hemorrhage or hematocele should always lead one to suspect this accident.

From *retroversion* of a *gravid uterus* it is known by the tenderness of the retro-cervical mass, and the digital or bimanual discovery of the fundus over or in front of the cervix, or by the passage of the sound upward toward the abdominal cavity. The sound may be gently passed upward and forward, for there can be no danger of it entering the cavity of the retroverted uterus so long as the end is not allowed to go backward.

In many instances we cannot distinguish the gravid tube from *cystic salpingitis* or *pelvic tumors*, but a careful consideration of the history, signs and symptoms will often clear up the diagnosis. The expulsion of the decidua is

positive proof if intrauterine pregnancy can be eliminated, or if the absence of the decidua reflexa can be demonstrated (par. 3).

In *normal pregnancy* the uterine body is more globular, and the discovery of the enlarged tube would make the presence of a fetus in utero improbable, although not impossible.

The diagnosis after operation is made by finding the fetal parts or chorionic villi on the remains of the sac.

The fetal sac at the beginning of the second month is about the size of a pigeon's egg; at the end of the second month it is the size of a walnut; at two and one-half months the size of a hen's egg; at three months the size of a fist; at four months the size of two fists. (v. Ott.)

The rupture of a pyo-salpinx may be mistaken for that of a pregnant tube. The following table taken from the "American Text Book of Gynecology" places the symptoms of each in juxtaposition :—

RUPTURED ECTOPIC GESTATION.	RUPTURED PYO-SALPINX.
Frequency of pulse greater.	Frequency of pulse less.
Temperature at first subnormal; later rises slightly.	Temperature rises steadily and markedly.
Pain of shorter duration.	Pain of longer duration.
Patient shows loss of blood.	Patient does not show loss of blood.
Septic symptoms not usually present.	Patient soon shows signs of sepsis.

12. **The Prognosis** without interference is unfavorable both for the mother and the fetus. If a diagnosis is made before tubal rupture, the danger to the mother may be considered much greater without than with a well-performed peritoneal section. Intraperitoneal rupture is frequently fatal from hemorrhage, and the danger from peritonitis and pelvic hematocele with septic complications are considerable if the patient survives. Extraperitoneal rupture

seldom causes death by hemorrhage, but endangers the life from subsequent septic changes, or continued development of the fetus.

13. **Treatment.** The treatment will be considered as adapted to the stage before, at the time of, and after abortion or rupture.

Before tubal rupture or abortion the best treatment consists in a removal of the tube and ovary by abdominal section, and suture of any rents that may be found in the broad ligament or uterine horn.

When the diagnosis is made the danger of rupture is already imminent, and any less radical method would be to court greater dangers than that of a peritoneal section by a skillful operator.

If the diagnosis, however, can be made before the end of the sixth week, the fetus may be destroyed by a galvanic current as strong as can be borne and passed from a vaginal or rectal electrode to a large external electrode placed a little above Poupart's ligament; but preparations should immediately be made for an abdominal section to be performed upon the supervention of internal hemorrhage, or of the colicky pains that so often precede the abortion or rupture.

Hypodermic injections of morphin into the fetal sac are an efficient feticide, but are liable to produce hemorrhage or sepsis, and, therefore, not as safe as electricity, nor as a properly performed abdominal section.

14. *At the time of rupture or abortion,* with symptoms of a serious hemorrhage and without the signs of an accumulation in the broad ligament, an ice-bag should be put on the lower abdomen, and the abdomen opened as soon as preparations can be made. If the hemorrhage has ceased a few hours' watchful delay, until reaction has taken place, is permissible.

When the blood is extravasated in the broad ligament,

an ice-bag should be kept on the lower abdomen for forty-eight hours, and the patient be as nearly as possible immobilized for three or four days, *i. e.*, not allowed to raise her shoulders from the bed, nor to turn over in bed without assistance. After that she should lie in bed for two weeks, or until absorption of some of the blood, as indicated by shrinking and hardening of the mass, are demonstrated by vaginal examination.

In case the first intra-peritoneal hemorrhage is slight, and the conditions for an operation are unfavorable, this treatment may be employed, and preparation be made to operate upon the recurrence of hemorrhage. If a hematocele form in the cul-de-sac the immediate danger is much lessened.

Before making the incision the patient's abdomen should be scrubbed with alcohol and ether and with a 1-2000 corrosive chlorid solution. The first thing to do after opening the abdomen, is to either ligate and remove the ovary and tube, or to put hemostatic forceps on the uterine and ovarian arteries in order to check the hemorrhages. The blood may then be sponged out, and the pelvic cavity, if filled with clots, be flushed with a 6-10 of one per cent. solution of chlorid of sodium in sterilized water. Drainage will not be necessary if the bleeding vessels have all been secured. An enema composed of a quart of the saline solution with 60 grams, or two ounces, of brandy may be thrown into the colon before the patient is put to bed.

15. *After rupture* with continued growth of the fetus, it is comparatively safe to remove it up to the beginning of the fourth month. Between the fourth and the eighth month the fetus should be destroyed by electricity and an operation be postponed for two months to allow the placenta to atrophy, unless the symptoms call for its removal sooner. After the eighth month an endeavor should be made to deliver a living child during the first week of the ninth month, thus giving the child a chance without adding much to the dangers of the mother. (Rein.)

The child has almost as good a chance to live if born three weeks

before term as at term, because the limited space and imperfect placenta prevents it thriving well after that, while the continued growth of the placenta would render the operation more dangerous.

16. After spurious labor and death of the child it is better to wait two months for the placenta to lose its vitality before operating, unless symptoms of sepsis should supervene, when the child should be removed.

Fenger has shown that sepsis and ulceration may take place without at first giving any decided warning, hence the case should be carefully watched.

The steps of the removal are about as follows: A short abdominal incision laterally over the most prominent part of the tumor. Examination of the sac and prolongation of the incision, in the endeavor, if possible, to avoid the placenta. In case the peritoneal cavity has been entered, and the fetus is dead, the peritoneal edges should be temporarily stitched to the parietal edges in order to prevent infection of the peritoneal cavity. Then the sac is incised, the bleeding edges clamped, the fetus carefully delivered, the umbilical cord cut between two pairs of forceps and tied near the placenta. The sac is then sewed up, the field of the operation disinfected, temporary sutures removed, and the sac enucleated if possible, leaving shreds on the intestines or other vascular areas, and ligating and suturing other bleeding places. The uterine and ovarian artery are always to be ligatured if found. (Olshausen.) The bed is tamponed with strips of iodoform gauze brought out at the lower end of the abdominal wound.

If this cannot be done, or if the surgeon have had but little experience in abdominal surgery, the sac may be stitched into the abdominal wound, and kept open until the placenta disintegrates and comes away in pieces. The process is tedious, and fraught with some danger from sepsis. The placenta can be mummified by being covered with benzoate of sodium. (Werth.) After the discharge becomes purulent or offensive, the gauze should be removed and the cavity be washed out three times daily with an antiseptic solution, such as a 1 per cent. solution of carbolic acid, twice daily, and 1-3000 mercuric corrosive chlorid (followed by sterilized water) once daily. A large rubber tube should be kept in the opening for drainage. Same instruments as for ovariotomy.

Vaginal incision, or elytrotomy, consists in making a vaginal incision over the presenting part and enlarging it by tearing. The fetus

is removed with the forceps if the head present, otherwise by turning. The placenta is not disturbed. If hemorrhage take place a quart or more of a 20 per cent. solution of ferric perchlorid in water may be injected and allowed to flow out, and then the contracted sac be carefully tamponed with strips of iodoform gauze. This method is hardly to be recommended unless the fetus have been dead at least a month, for the danger of hemorrhage has proven to be great, and the means for its arrest are apt to be inadequate. It should never be done unless the fetal parts form a prominent tumor in the posterior wall of the vagina. (Fenger.)

If uncontrollable hemorrhage occur it may be necessary to remove the uterus, or even to open the abdomen, in order to bring the bleeding tissues within reach.

17. After a mummified fetus has disintegrated and begun to discharge through one of the viscera, or through the skin, the process should be favored by enlarging the opening and taking away the parts as they present. The cavity should be cleansed by antiseptic irrigations. Even when the parts are being discharged into the bladder, the urethra may be dilated, the parts removed, and the cavity and bladder be irrigated with a saturated solution of boracic acid. Strong antiseptics should never be injected either by way of the bladder or rectum.

18. **Pregnancy in a Rudimentary Uterine Horn.**—The fecundated ovum finds lodgment in a rudimentary uterine horn much more rarely than in the Fallopian tube, less than two score of such cases having been so far reported.

The mode of impregnation may be by passage of the spermatozoa through the cervical opening of the rudimentary horn, or if that opening be impervious, as is apt to be the case, it is by migration of the fecundated ovum from the opposite side. When the cervical opening is pervious and the corresponding ovary rudimentary, the ovum may migrate from the opposite side and become fecundated in the rudimentary side. The corpus luteum of pregnancy has been found on the opposite side in a number of instances.

19. When the impregnated uterine horn is small, but not, strictly speaking, rudimentary, the pregnancy may go on to

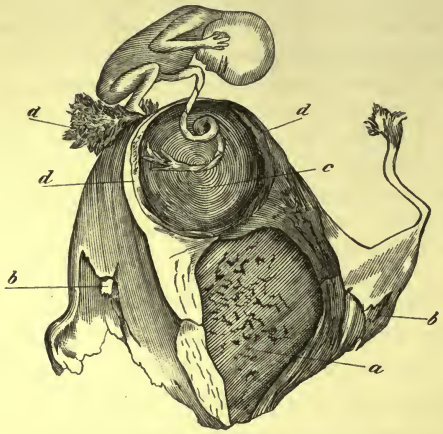

FIG. 232.—INTERSTITIAL PREGNANCY. (*Poppel.*)
a. Uterine cavity. *b*. Round ligament. *c*. Gestation-sac. *d*. Chorion.

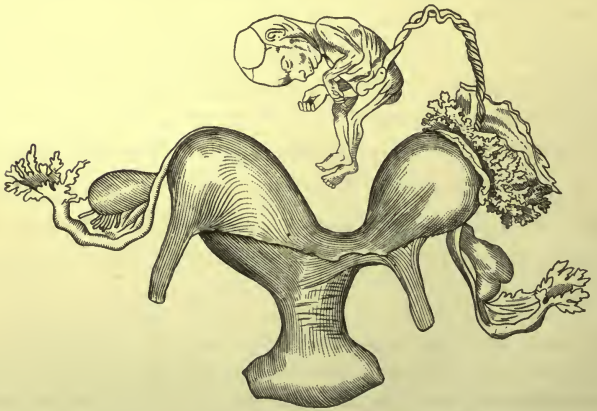

FIG. 233.—PREGNANCY IN A LEFT RUDIMENTARY UTERINE HORN—FRONT VIEW.
(*Heyfelder-Kussmaul.*)
Rupture in the fourteenth week.

six or more months, and then rupture into the abdominal cavity, or it may go to term with death of the fetus and be

followed later by the supervention of sepsis or the formation of a lithopedion. In such cases a normal, or approximately normal, decidua and placenta are present.

In proportion, however, as the impregnated horn is small and rudimentary, the changes that occur resemble those of tubal pregnancy, and the clinical history follows the same rule.

20. The *diagnosis* from tubal pregnancy is based upon the discovery by the bimanual palpation of the attachment of the impregnated horn to the uterus in the neighborhood of the internal os, and of the round ligament to the outer side of the mass.

If the impregnated horn resembles more an imperfectly developed side of a septate uterus without a pronounced sulcus between the cornea, it may be impossible to differentiate it clinically from interstitial pregnancy.

21. The *treatment* consists in amputation of the sac. As the placenta is usually situated in the sac, the removal of the sac and the entire products of conception is ordinarily much safer than in cases of advanced tubal pregnancy.

CHAPTER II.

PELVIC HEMATOCELE AND PELVIC HEMATOMA.

1. By *pelvic hematocele* we understand an effusion of blood into the pelvic peritoneal cavity; by *pelvic-hematoma*, an effusion of blood into the pelvic connective tissue. (Tait.)

2. **Pathological Anatomy.** In *pelvic hematocele* the effusion usually pushes the uterus forward and the intes-

tines upward, and may partly or completely fill the pelvis. When the uterus is adherent in the back part of the pelvis, the blood may be found in front of it.

FIG. 234.—RETRO-UTERINE HEMATOCELE. *U.* Uterus. *R.* Rectum. *A.* Blood-clot. (*R. Barnes.*)

In *pelvic hematoma* the effusion is into the subperitoneal connective tissue, and if small, occupies a portion of one of the broad ligaments. If large it usually passes posteriorly across the median line and into the sacro-uterine ligaments, and pushes the cervix upward, over and a trifle to one side of the symphysis pubis. Exceptionally it passes across in front of the cervix. The rectum, and sometimes the ureters, are compressed.

The effused blood in either case undergoes coagulation into a dense corrugated mass, or becomes encysted as a tarry fluid. It may undergo absorption, or remain encysted for an indefinite period, or be transformed into pus. The pus found in a hematoma is usually offensive, from the invasion of intestinal germs.

The changes in the pelvic organs are those that have caused the hemorrhage.

3. **Etiology.** The most frequent causes are the rupture or abortion of a gravid Fallopian tube, and operations involving puncture of veins, imperfect ligation of vessels, or the separation of adhesions. Among occasional causes may be mentioned: abortions in connection with peritoneal adhesions (particularly if followed by curettage), rupture of

varicose veins of the broad ligament, or of an hematosalpinx or ovarian hematoma; hemorrhage into the diseased tube during menstruation, particularly during attempts at menstruation in cases of atresia of the cervix or vagina; the rapid evacuation of the uterus for hematometra; malignant disease of the tube.

4. **Symptoms.** The symptoms in the majority of cases are those of the extra-uterine pregnancy upon which it depends. In other cases the first symptom is a sharp pain in the lower abdomen, followed by faintness, nausea, depression of temperature, and occasionally by syncope. After a few hours reaction takes place with slight elevation of temperature and, if the effusion be in the peritoneal cavity, with some tympanitic distention of the lower abdomen. The pains subside rapidly if the patient remains in bed, but return, sometimes accompanied by a recurrence of hemorrhage, if she gets up within twenty-four hours, as she usually wishes to do.

Symptoms due to pressure soon manifest themselves, such as obstinate constipation, sometimes dysuria and painful defecation, and even symptoms of rectitis. Iliac tenderness with neuralgic radiating pains may be present, but pain is seldom a prominent symptom.

The menses are apt to be prolonged, and unusual exertions sometimes bring on a slight intermenstrual bloody flow.

5. **Physical Signs.** It is often possible to distinguish a soft mass, increasing in hardness day by day, by deep pressure over the pelvis.

Hematocele, as felt per vaginam, presents a soft, somewhat elastic, rounded tumor in the recto-uterine pouch behind the uterus, displacing it forward toward the pubes. If anterior to the uterus, it is felt bimanually over the vesico-vaginal septum.

A *hematoma* of small size is at first doughy, and is situated beside the uterus; if large, it feels elastic, fills the pelvis at one side and posteriorly, pushing the uterus toward the opposite inguinal canal, and is so intimately joined to it as to immobilize it. The mass is lower in the pelvis and the uterus relatively higher than in hematocele.

In hematocele rectal indagation reveals an effusion in the broadened recto-uterine cul-de-sac, in front of and to the right of the rectum, while in hematoma it demonstrates the extension of the blood around the rectum into the sacro-uterine ligaments, and against the lateral pelvic wall. In the former the sacro-uterine folds can often be felt under the effusion; in the latter, the coagulated blood may form a ring around the rectum, behind the cervix.

6. **Course and Termination.** Usually the tumor becomes perceptibly smaller and firmer after a few days. The surface becomes somewhat uneven and hardened in places, owing to absorption of the serum and shrinking of the clot. Not infrequently the hematocele becomes firmer, but remains large, elastic and smooth almost indefinitely, owing to a want of coagulation and absorption of the fluid contents.

In many cases, particularly of hematoma, the mass becomes infected after a few weeks or months, and forms a large abscess that may remain for a long time as a source of irritation, or discharge into the rectum or vagina or elsewhere, the same as any pelvic abscess. (See part 6, chap. XII.)

7. **The Diagnosis** from *inflammatory exudates* is not difficult when we remember that the reaction and tenderness subside too rapidly for an inflammatory exudate of the same size, and leave but few or none of the symptoms of inflammation.

From *tumors* it is known by the symptoms attending its sudden appearance and by its shrinkage or failure to grow. The rupture of an abdominal tumor is known by the previous abdominal enlargement, the lack of firmness of the extravasated mass and lower and more central position of the uterus.

8. **The Prognosis** is usually favorable as far as life and death are concerned. Suppuration may render the case serious, but the evacuation of the resulting abscess is generally easily accomplished. Displacements of the pelvic viscera, intestinal adhesions, fistulæ and sterility are apt to be produced by the absorption of the clot or discharge of the pus, and may trouble the patient for some time.

9. **Treatment.** At the first onset rest in bed, an ice-bag over the pubes for twenty-four hours, cool drinks and stimulants in case of syncope are indicated; afterward, rest in bed for two or three weeks, counter-irritation over the abdomen by the tincture of iodin applied twice daily over the lower abdomen, saline laxatives and a light diet.

10. When suppuration ensues, the mass should be punctured per vaginam with an aspirating needle or small trocar as far back and as near the median line as it can be reached, and guided by the finger rather than by sight through a speculum. Pulsating vessels must be carefully avoided, and thorough antiseptic preparations be made. When the pus is reached, it should be evacuated as recommended for pelvic abscess (part 6, chap. XII, par. 14, 15, and 16).

Some pelvic hematoceles are not accessible from the vagina, and may either suppurate or cause continued invalidism by their presence. In such cases the abdomen is opened as for oophorectomy, and if upon exploration it is found to be an abscess that can be evacuated from the vagina, under guidance of the fingers in the abdomen (A. Martin), it should be so treated. If not, the sac can sometimes be stitched to the abdominal wound, and in two or three days, or after

adhesion to the surface has taken place, it can be evacuated extra-peritoneally.

When there is no suppuration, the mass can sometimes be partially or completely enucleated and the abdomen be closed immediately, or drained for thirty-six hours, according to the amount of oozing following. Or the blood may be evacuated, and the capsule be packed with gauze extending out through the abdominal incision.

If interference be deemed necessary during the first few days, it should be by abdominal section, in order that the parts may be secured against secondary hemorrhage. After two weeks or more have elapsed, and the mass is firm, evacuation per vaginam is probably safer, as there is no longer danger from hemorrhage, and it is desirable to avoid opening the peritoneal cavity.

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